SUPPORT DOCUMENT

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Relating to
The Air Operating Permit
for

Fort James Camas L.L.C.
401 N.E. Adams Street
Camas, WA   98607-1999

State of Washington
Department of Ecology
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Introduction

Federal and state laws require any pulp and paper mill operator to obtain an Air Operating Permit (AOP) from the Department of Ecology (Ecology). The AOP licenses the mill to operate for five years. During this time, the facility shall limit air pollution, concentrations, and amoun of its releases to the atmosphere.

Each AOP imposes conditions upon the operations of the permittee (permit holder). General Conditions apply to every pulp and paper production facility in Washington State. Unit Specific Conditions apply to an individual facility. This Support Document explains the reasons Ecology imposed specific conditions upon this particular mill. It details recent plant changes, pollution control technologies, performance standards, and historical data that informed the permit writer's choice of Conditions.

The Support Document is not part of the Air Operating Permit for Fort James Camas LLC. None of the explanations can be enforced against the permittee, unless the content was otherwise enforceable as a Condition of the permit or as a section of an attendant Regulatory Order. Publishing this Support Document fulfills Ecology's duty to "...state the origin and legal authority for each requirement...based upon the most stringent..." [RCW 70.94.161(10)].

Statement of Basis

The Washington Administrative Code (WAC) contains rules that describe how each state agency applies ots power to fulfill its duty. The purpose of the Code is to ensure consistent and gair administratiion of the law. Title 173 of the WAC tells how Ecology exercises its power and fulfills its duty to regulate waste. Chapter 401, within that Title, tells how Ecology regulates industrial sources of air pollution. The Statement of Basis identifies the laws and facts Ecology's permit writer applied to derive each Permit Condition imposed in the draft AOP for the Fort James Camas Mill [WAC 173-401-700(8)].

In the Permit, the applicable statutory or regulatory provisions appear under the "Applicable Requirements" column in tables, or they are enclosed by brackets within the text. In this Support Document, the permit writer explains why those requirements apply to this facility and what formula was used to calculate the numeric measurements.

I. Assuring Compliance With All Applicable Requirements

The Air Operating Permit requires the permittee to comply with a compilation of applicable federal requirements and applicable state-only requirements. State-only requirements are clearly identified in the AOP; they are not federally enforceable. Explanations in this Support Document focus on those enforceable federal requirements.

The AOP includes emission limits, monitoring methods and reporting procedures, and appropriate operating requirements. Some emission points have more than one limit and/or applicable requirement for a particular pollutant. Multiple limits are usually based on two or more applicable requirements. Multiple limits are generally listed in order, from most stringent to least stringent, in a single Condition in the AOP. Applicable requirements may include federal regulations, state regulations, Regulatory Orders, and Prevention of Significant Deterioration (PSD) Permits.

Regulatory Orders currently in effect include:

PSD-88-3/Modification 2

Order DE-88-360/Modification 2

Order DE-96-AQ-I059
Order DE-95-AQ-I050
Order DE-93-AQ-I140
Order DE-87-309
Order DE-1147-AQ04

We included a copy of each of these Regulatory Orders in Appendix F of the AOP.

Periodic monitoring requirements are generally specified in Regulatory Orders and PSD Permits. Also, some periodic monitoring and reporting requirements are specified in regulations. In such cases, the monitoring and reporting required by applicable rule and regulations and the existing AOP is included in the permit. When no periodic monitoring already exists Ecology assigns periodic monitoring requirements in the AOP. Ecology derives the monitoring and reporting procedures by applying “best professional judgment” in context with the specific source’s historical performance and projecting the expected frequency and magnitude of potential “exceedences” (releases of more than the permitted amount). Ecology prescribes the periodic monitoring requirements to assure compliance with emission limits, as required by the AOP program.

Usually the AOP requires “direct measure” of the emissions as the monitoring method, in the absence of other regulatory requirements. Direct measure monitoring is preferred due to its accuracy. When obtaining a direct measure is difficult or impossible – e.g., taking an opacity measurement of wet stacks -- an indirect surrogate parameter is specified.

In some cases, performance measurement may rely on periodic direct source testing and on frequent indirect monitoring using surrogate parameters. Excursions from surrogate parameter monitoring ranges require corrective action just as deviations from direct measurements do. A permittee’s failure to take timely corrective action constitutes noncompliance with good operation and maintenance requirements [WAC 173-405-040(10)] and possible noncompliance with the underlying requirement.

This draft Air Operating Permit would renew an existing permit. Major items added to the proposed AOP as part of the renewal include:

- MACT I requirements [40 CFR Part 63, Subpart S] -- national emission standards established by the U.S. Environmental Protection Agency (EPA) to control hazardous air pollutant emissions from the pulp and paper production areas of the mill – the letters stand for Maximum Available Control Technology,
- Order DE-1147 about the conversion of the Magnefite Recovery Furnace into the No. 5 Power Boiler
- Compliance Assurance Monitoring (CAM) requirements [40 CFR Part 64], and
- MACT II requirements [40 CFR Part 63, Subpart MM] are the national emission standards established by the EPA to control hazardous air pollutant emissions from the pulping chemical recovery combustion areas of the mill.

This Support Document describes specific monitoring requirements for showing compliance with federally enforceable emission limits from the mill’s principal sources. Those actual limits, and other applicable requirements, are included in the AOP.

<u>Insignificant Emission Units</u>

Facility-wide general requirements apply to the whole facility, including insignificant emission units and activities (IEUs). The Air Operating Permit rule allows, however, that IEUs are not subject to monitoring requirements unless the State Implementation Plan (SIP) for the AOP Program imposes them. [WAC 173-401-530(2)(c)]. But the Washington SIP does not impose specific monitoring requirements in its facility-wide requirements for IEUs. The proposed permit, therefore, does not require Fort James to conduct testing, monitoring, reporting, or recordkeeping for insignificant emission units or activities at its Camas mill.

II. Air Operating Permit Application

On April 27, 2004 Fort James Camas LLC submitted an application for an air operating permit under Title V of the federal Clean Air Act Amendments, requesting renewal of the existing AOP.

A. Facility Description

Fort James Camas L.L.C. Mill is located on 661 acres adjacent to the Columbia River in Clark County, Washington, with its entrance at 401 NE Adam Street. It has occupied this site since 1883 when it was constructed to supply newsprint for the Portland area.

The Mill currently produces over 460,000 to 490,000 tons per year of tissue, toweling, and communication papers. Raw materials in the form of wood chips, sawdust, waste paper, chemicals, and pulp arrive from all over the West by truck, barge and rail car.

The Camas Mill uses the kraft process to convert wood chips and sawdust into pulp. The brown pulp is then bleached in one of two bleach plants. Most of the paper grades produced contain a blend of these pulps and purchased pulp, and secondary fiber recycled from waste paper. Currently six machines produce paper, five of them towel and tissue grades, the other machine produces communication papers. The oldest paper machine dates from 1910 and the newest was built in 1984. Daily production ranges from 30 tons per day on the smallest paper machine to over 700 tons per day on the newest and largest. The mill sells its rolls of paper from the machines are sold directly to printers and converters or further processes them into finished goods. The mill also operates a pulp dryer to produce baled pulp for internal use or sale.

Wastewater receives primary and secondary treatment before discharge to the main channel of the Columbia River. The clarifier, aeration basins and solid waste landfill are located on Lady Island, a 476 acre site separated from the mill proper by the Camas Slough.

The Camas Mill employs approximately 1000 people. Most processes operate 24 hours each day, 7 days a week and 52 weeks a year. Production equipment can be shut down for cleaning, maintenance, or to control output. The entire facility is shut down periodically for maintenance and cleaning.

Several other company operations are located north of the mill site. These operations include the Camas Business Center which includes Wood Fiber Procurement, Project Management and Engineering, Corporate Environmental Services, and a sales office.

Pacificorp, the Burlington Santa Fe Railroad, the City of Camas, the Washington State Department of Transportation and others have right of way access through the Camas Mill. In addition, the Camas Slough, a public waterway, passes through the site. Neither Fort James Camas L.L.C. nor the Camas Mill have any responsibility for equipment or activities associated with these other parties.

B. Process Details

1. Facility General

Mill-wide processes include: utilities, effluent treatment, transportation and fuels; roads, grounds, material handling between processes; construction, demolition, housekeeping; and laboratory and office work.

Water is supplied from on-site mill's wells, the Camas Slough, and a system of dams and ditches from Lacamas Lake. Potable water is supplied by the City of Camas. Raw water used for the mill's processes is treated with sodium hypochlorite and polymers, then settled, and filtered before distribution.

Waste heat from some processes is used to produce warm or hot water. This is stored and distributed for use by other processes throughout the mill.

The mill purchases electricity from Pacificorp and Clark County Public Utilities.

Air compressors are located at various sites throughout the mill and feed into a common distribution system.

The mill uses natural gas for area heating, paper drying, process heating, and steam generation. The gas supply arrives via both a high-pressure line from Northwest Pipeline and a low-pressure line from Northwest Natural Gas.

The mill collects, screens, and pumps its neutral and alkaline process sewer to a clarifier on Lady Island across the Camas Slough. Thickened waste fiber from the clarifier is thickened can be burned as fuel in the wood waste boiler, or conveyed to an on-site landfill. A pipe under the slough carries corrosive sewer, which flows naturally by gravity to join the clarifier effluent. The mill transports the combined effluent through a pipe to two aerated stabilization basins (ASB's) in series. The treated effluent is discharged to the Columbia River. Urea ammonium nitrate and phosphoric acid are added as nutrients to nourish bacteria and are necessary for the operation of ASB.

Sanitary sewage is processed by the City of Camas.

Incoming materials and goods are handled by conveyor, fork truck, tractor train, front end loader, dump truck, and other vehicles. Raw materials and finished goods are shipped by rail, truck and barge. These vehicles use gasoline, diesel, LPG and batteries as fuels.

2. Steam and Power Generation

(1) Wood waste boiler No. 3 Power Boiler and (1) fossil fuel boiler, No. 4 Power Boiler, including feedwater processing; #6 fuel oil receiving, storage and distribution, and electric power generation.

The No. 3 Power Boiler uses hog fuel (woodwaste), natural gas, and primary wastewater treatment plant sludge to generate steam. The No. 4 Power Boiler uses natural gas and/or No. 6 fuel oil. The No. 5 Power Boiler uses natural gas, No. 6 fuel oil, kraft non-condensible gases (NCGs), and foul condensate steam stripper off-gases (SOGs) to generate steam. Steam is generated at 600 psi by burning natural gas, No. 6 fuel oil, hogged fuel, SOGs, NCGs, and/or spent liquor from the pulping processes. The steam flow is directed to a turbine generator. The pressure drop generates electricity before the lower quality steam distributes to production processes. The output is sold to a utility company. The steam is extracted at 150 psi, 75 psi, and 40 psi.

Hog fuel is stored in an open pile. When needed, it is pushed to a reclaim pit by crawler tractor, then carried by conveyor belt to a live bottom hopper. The hopper screw meters the hogged fuel into the boiler feed system.

The No. 6 fuel oil arrives by truck, and it is stored in a heated tank. Before use, the mill transfers it to a smaller day tank and then distributed to the boilers (No. 4 Power Boiler, No. 5 Power Boiler, No. 3 Kraft Recovery Furnace and No. 4 Kraft Recovery Furnace and lime kiln).

The hog fuel boiler, No. 3 Power Boiler, burns wood waste or natural gas. Solid fuel is burned on floor grates. Cinders are returned to the firebox and fly ash is captured in an electrostatic precipitator (ESP). Bottom ash is sluiced, drained and hauled off site where it is used as a drainage layer in landfill construction. Wood waste is fed to the boiler via the hogged fuel system. Conventional burners are used for natural gas combustion.

3. Wood Processing -- *Wood receiving and processing; wood chip receiving, storage, handling, screening and delivery; sawdust receiving, storage, handling, screening and delivery, hog fuel receiving, storage, handling & delivery*

Wood chips, sawdust and hog fuel arrive by barge or truck. Chips also arrive by rail. Wood handling is by bucket, drag chain, belt conveyor, airveyor or crawler tractor. The material is stored in open piles or in closed silos. No chips are currently produced on site.

Crawler tractors are used to reclaim chips from the pile storage. Turntables meter chips from the silos. Wood is screened and the acceptable chips conveyed by belt to the digesters. Oversized wood can be re-chipped. Fine material may go to the digesters, sawdust system or be sold. Knots and gross oversized material are diverted to hog fuel.

Sawdust is reclaimed by crawler tractor, then screened and blown to a cyclone separator above the sawdust digester silo.

Hog fuel is pushed to a reclaim pit by crawler tractor, then carried by belt conveyor to a live bottom hopper. Hog fuel is sometimes stored at a permitted site on Lady Island and moved to the mill by truck, as it is needed.

4. No. 5 Power Boiler Conversion (Former Magnefite Sulfite Pulping Process)

The Magnefite sulfite continuous pulping process was permanently shutdown in October 2001. The Magnefite Recovery Furnace was converted to the No. 5 Power Boiler in September 2004 and became operational in May 2005.

The kraft non-condensible gases (NCGs) and the foul condensate steam stripper off-gases (SOGs) are incinerated in the No. 5 Power Boiler. The power boiler can be fired with natural gas or No. 6 fuel oil. The Magnefite evaporator and Magnefite Kamyr continuous digester were converted to the kraft process. Ten softwood batch digesters, Digester 1 through 10, and one kraft evaporator, No. 1 Evaporator, were permanently shutdown when the continuous digester and evaporator became operational.

5. Kraft Recovery -- *(3) kraft multiple effect evaporator sets, (1) blow heat evaporator, (3) kraft liquor concentrators and (2) Kraft chemical recovery furnaces*

The weak black liquor washed out of kraft pulp is thickened to about 50% solids in one of three multiple effect evaporator sets, No. 2 Evaporator, No. 3 Evaporator, No. 4 Evaporator or in a blow heat evaporator. It then goes to one of three concentrators to raise the solids to 70% before being burned in the recovery furnaces. Black liquor is stored in tanks between each step of the solidification process. Kraft non-condensible gases (NCG's) from the evaporators and concentrators are incinerated in the No. 5 power boiler and/or No. 4 lime kiln. Contaminated condensates are reused at the washers. In April 2000, the mill completed construction of a Foul Condensate Steam Stripping system. Since that time, foul condensates have been collected and stripped. The mill burns Stripper Off-Gases (SOGs) in the No. 5 Power Boiler or the No. 4 lime kiln.

Two kraft recovery furnaces are available to burn the concentrated black liquor. Heat is released to generate steam and a smelt (molten inorganic chemicals) drains from the bottom of the furnace into an agitated tank. There it is dissolved in wash filtrate (weak wash) from the recausticization process, to form a solution of sodium carbonate and sodium sulfide (green liquor). Particulate entrained in the furnace flue gasses is captured in a precipitator and mixed with the black liquor going to the furnace. A caustic scrubber following the precipitator then removes most of the remaining particulate and sulfur dioxide. Gasses finally pass through a wet heat recovery system before releasing through a stack to the atmosphere.

The green liquor is pumped from the dissolving tanks to the recausticization process. Steam and gasses released in the tanks pass through wet caustic scrubbers before releasing to the atmosphere.

Both kraft recovery furnaces can burn natural gas or No. 6 fuel oil as an auxiliary fuel. In April 2005, the HVLC collection system was installed. The HVLC gases are burned in either No. 3 Kraft Recovery Furnace or No. 4 Kraft Recovery Furnace. The EPA compliance date for the HVLC system is April 17, 2006.

6. Recausticizing and Lime Kiln Area

The recausticization and lime recovery phase of the kraft process convert spent pulping chemicals from the recovery process into active alkaline cooking liquor. Clarified green liquor (sodium carbonate and sodium sulfide) is mixed in a slaker with hot lime (calcium oxide) from the kiln or fresh lime delivered by truck. Calcium carbonate then settles out as sludge in the white liquor clarifiers. White liquor (sodium hydroxide and sodium sulfide) can then be used in the kraft pulping processes. The lime sludge is washed, filtered and calcined in a kiln to be reused in the recausticizing process. The kiln is fired with natural gas or No. 6 fuel oil. It is also employed as an incinerator of the kraft NCGs and SOGs. Flue gasses from the kiln pass through a wet scrubber to remove particulate and sulfur dioxide.

7. Kraft Batch Pulping -- *Kraft batch cooking, washing, screening, pulp storage and heat recovery*

Kraft cooking begins when wood chips are mixed with an alkaline solution known as white liquor and cooked at high pressure and temperature in a digester. Belt conveyors deliver chips to the three kraft batch digesters at the Camas Mill. The filling process is augmented by an exhaust system which draws air from the digesters and expels it to the atmosphere through a cyclone, which removes entrained particulate. The digesters are filled with a mixture of white and black liquors, then closed and heated. The mill routes non-condensible gasses via. pipes through a turpentine recovery system to the Kraft NCG system for incineration in the No. 5 Power Boiler or lime kiln. After sufficient time and temperature, the cooked chips are blown to one of three blow tanks.

The blow tanks each feed two washing and cleaning systems. Pulp (brown stock) is first pumped through knotters to remove pieces of uncooked wood (knots), and then passes over drum washers to remove spent cooking chemicals and dissolved organics (creating weak black liquor). It then goes to storage. From the storage chests, the pulp goes through screening and cleaning before being bleached. Emissions from the brown stock washers and their associated equipment are vented to the High Volume Low concentration (HVLC) collection system. The process returns knots to the digesters.

Steam and hot gasses from the blow tanks pass through a blow heat recovery system to reclaim the usfula heat before the mill burns them either in the No. 5 Power Boiler or the lime kiln. Normally, those gases ar not vented. But by December 31, 2006, the Camas Mill will capture the gases from the Hardwood Batch Digester Air Evacuation system and incinerate them.

8. Kraft Sawdust Pulping -- *Kraft sawdust continuous cooking*

Sawdust is blown to a storage silo after screening. Two Pandia digesters receive feed from the silo, which they discharge to a single blow tank. Sawdust pulp is blended with chip pulps prior to washing and bleaching. All chemical systems are similar to batch kraft chip pulping. The process recovered heat from blow gasses and incinenates the NCG. The vents from Pandia rotary valve currently emit to the atmosphere. But by December 31, 2006, the Camas Mill will capture the gases and incinerate them.

9. Kraft Continuous Pulping -- *Kraft continuous cooking*

Kraft cooking begins when wood chips are mixed with white liquor and cooked at high pressure and temperature in a vessel called a Kamyr continuous digester. Belt conveyors deliver chips to the continuous digester. The digester is filled continuously with a mixture of white and black liquor. Ducts carry non-condensible gasses to the kraft NCG system for incineration in either the No. 5 Power Boiler or the lime kiln. After sufficient cooling, the cooked pulp is screened, washed and directed to one of the two kraft bleach plants.

The Kamyr continuous digester was converted from the Magnefite pulp process in May 2003. The Magnefite evaporator set was converted to the kraft process in April 2003. After the conversions, the mill shut down permanently ten batch digesters and one kraft evaporator.

10. Pulp Bleaching -- *(2) Kraft bleach plants, oxygen and extended delignification bleach chemical preparation and slush pulp storage*

The mill sends brown pulps to one of two bleach plants, the K4 or K5 Bleach Plant. One is a Kamyr displacement system and the other is a conventional bleach plant with reaction towers and drum washers. Oxygen, chlorine dioxide, caustic (NaOH), hydrogen peroxide, and sodium bisulfite are used in the bleaching process. For both bleach plants, all chlorine dioxide stage (bleaching sequence) vents are collected and directed to white liquor scrubbers. Caustic, sodium chlorate, methanol and other chemicals arrive by truck. Chlorine dioxide is produced on site by the ERCO R-8 process. The mill uses white liquor scrubbers to control emission points containing chlorine dioxide. Bleached pulp is stored in large tanks before delivery to the paper machines or pulp dryer.

11. Paper Making and Pulp Drying -- *(6) paper machines (No.1PM, No. 3PM, No. 9PM, No. 11PM, No. 14 PM, and No. 20 PM); pulp storage; repulp; mixing & distribution; pulp drying, sheeting & baling*

The mill has six paper machines and one pulp dryer. Feed stock for these machines comes from internal pulp, purchased pulp, internal broke (paper waste) or purchased waste paper. These fiber sources are mixed with additives such as fillers, starches, retention aids, dyes and other chemicals to make a wide variety of papers. The furnish for the pulp dryer is internal pulp with few or no additives. Heat for paper drying comes from steam by the power boilers and/or recovery furnaces.

The machines produce paper in large rolls which can be used in the Paper Finishing and Converting processes, or shipped to other facilities. The pulp dryer produces baled pulp for internal use or for sale.

12. Core Manufacturing

The mill produces cores for the towel and tissue products such as bath room tissue and paper towels. Adhesives are used in the physical process of making cores. This area exhausts directly to atmosphere through roof vents.

13. Paper Finishing & Converting -- *Sheeting or rewinding to produce finished or semi-finished paper products. Converting jumbo paper rolls to finished sanitary paper products including roll and folded towels and tissue*

This process uses rolls of paper from the machines to produce sheet products or smaller rolls. These may then be printed, they may be used internally, or they may be sold directly retail distributor as a finished product. Two large sheeters product paper for copiers, printers, etc. Specialized folders and rewinders manufacture towels and tissue.

14. Maintenance Areas -- *Maintenance activities for all processes including maintenance shops; equipment, structure and building repairs; demolition; painting; road and grounds maintenance; etc.*

Maintenance activities include equipment and facility inspections, upkeep, repairs, demolition and minor modifications. Asbestos upkeep and removal are also included in this process. To support these activities, the mill is equipped with shops, tools, painting facilities, cold degreasers, sandblasting equipment, and other facilities. Personnel conducting these activities may be Fort James Camas L.L.C. employees, contractors, or other workers such as owners of rented equipment or their agents.

III. Specific Emission Units

A. No. 3 Recovery Furnace

Condition A

<u>Major Changes that Affected Emissions</u>

The No. 3 recovery furnace was completely rebuilt in 1991. A new two-chamber, three-field electrostatic precipitator (ESP) and a packed bed, cross-flow AirPol^{TM} scrubber replaced the old two-chamber, three-field ESP and venturi and Teller scrubbers. The mill modified the secondary air system to support the incineration of High Volume Low Concentration (HVLC) gases in the No. 3 Kraft Recovery Furnace. This modification assures complete combustion of the methanol and total reduced sulfur (TRS) compounds that are the major components of the HVLC gases. The air system modification also significantly improves the “burnout” of carbon monoxide (CO). CO emission reductions resulted in the CO permit limit being reduced from 2,755 tons per year to 2,504 tons per year. The HVLC collection system became operational in April 2005. The HVLC gases can be incinerated in either the No. 3 Kraft Recovery Furnace or No. 4 Kraft Recovery Furnace.

Conditions A.1 and A.2 - Opacity and Particulate Limits

New source performance standards (NSPS) for kraft recovery furnaces (40 CFR Part 60, Subpart BB) limit particulate emissions to 0.044 grains per dry standard cubic foot (gr/DSCF). Ecology concluded that BACT requirements restrict PM_{10} emissions from this furnace to 0.033 gr/DSCF corrected to 8% oxygen.

The mill uses a monthly source test to measure particulate emissions. If the measument is less than 75% of the limit for six consecutive months, the mill may reduced the source test frequency from every month to once every three month (quarterly). The less frequent source testing is allowed only as long as source tests continue to demonstrate emissions are less 75% of the limit.

No. 3 Recovery Furnace is not subject to NSPS, under 40 CFR Part 60, because the cost of the rebuilt was less than 50% of a new, similar sized unit [60.14(a) and 60.15(b)(1)], and particulate and TRS emissions did not increase from the furnace rebuilt. The New Source Performance Standards (NSPS) for a kraft recovery furnace restrict visual emission level to 35% opacity at the stack. Ecology determines that visual emissions will be limited to 20% opacity at the No. 3 Recovery Furnace.

Because the stack plume is wet, an opacity monitor will not work. On March 1, 2004 Fort James Camas installed equipment to measure the secondary voltage and current in each precipitator field. 40 CFR 63 Subpart MM and in particular 63.864 allows the use of a site-specific monitoring plan if the pollution control system makes a continuous opacity monitor technically inappropriate. Fort James submitted a request to use ESP secondary power as an alternative monitoring approach. Ecology approved this site-specific alternative monitoring approach on June 21, 2004. Fort James completed a monitoring study and submitted a report entitled "Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance" on November 2, 2004. This study showed that ESP secondary power and scrubber pressure drop were appropriate monitoring parameters that would indicate continuous compliance at the No. 3 Kraft Recovery Furnace.

Continuous monitoring of the pressure drop through the scrubber and the ESP's secondary power will be used as the compliance indicator for particulate and opacity. The hourly averages of the pressure drop through the scrubber will be at least 2 inches of water and the hourly average secondary power of the electrostatic precipitator (ESP) will be at least 40 kilowatts. Method 9 opacity readings may be used if the minimum operational parameter is out of the prescribed operating value. This will override the minimum operational parameter results or the permittee must bring the system back into the prescribed minimum operating value within 24 hours.

Condition A.3 - Sulfur Dioxide Limit

Ecology currently restricts sulfur dioxide (SO_2) emissions from kraft recovery furnaces to 500 parts per million corrected to 8% oxygen. Ecology determined that BACT for this furnace limits sulfur dioxide emissions to 10 ppm corrected to 8% oxygen on a 24-hour average. A monthly test, using TRS continuous emission monitor (CEM) (EPA Method 6C) shows compliance. The furnace emissions measured below the limit every month since 1993. Ecology considers the monthly sulfur dioxide test frequency sufficient to indicate continuous compliance.

Although there is only a small probability that the recovery furnace would be out of compliance between periodic tests, we place a minimum operational condition in the permit to show that the scrubber is operating. The permittee must monitor the pH of the scrubber liquor to assure a pH reading above 7.

Condition A.4 - Nitrogen Oxides Limit

The oxidation/reduction reactions that occur in a black liquor recovery furnace tend to generate less nitrogen oxides (NO_x) emissions than most other large combustion devices. Because of the design of the furnace, Ecology determined that best available control for NO_x is through good maintenance and operation, which was approved during the PSD permitting process in the 1990 mill modernization project. The No. 3 recovery furnace is limited to a NO_x emission rate of 1.3 lbs/ton black liquor solids (BLS). Historical stack tests have demonstrated compliance at a level well below this limit. During the public involvement [WAC 173-401-800] in the past permit cycle Ecology showed that continuous emission monitoring for NO_x from the recovery furnaces was unnecessary. In summary, the rationales for the determination are listed below.

- NOx emissions from these kinds of processes do not change very much with time; stage-air combustion keeps the temperature below the NOx formation temperature (thermal NOx) and the nitrogen content in black liquor is constant (fuel NOx). [NCASI Special Report 99-01, April 1999, "A Review of NO_x Emission Control Strategies for

Industrial Boilers, recovery furnace, and lime kiln," and Source Test Data 1990, 1995, 2000, and 2004, Fort James Camas LLC.] The NCASI report indicates that NO_x is generated strictly from black liquor combustion in kraft recovery furnaces from the nitrogen content "fuel NO_x" mechanism pathway. Based on the NO_x test results from 1990 to 2004, which indicate that the concentrations of NO_x emissions at the No. 3 and 4 recovery furnaces are fairly constant with time, Ecology found that the furnaces were operated at a desirable base-load as discussed below. Therefore, NO_x emissions are expected to vary insignificantly.

- NOx tests in 1990, 1995, 2000, and 2004 conducted for the recovery furnaces clearly showed the NO_X emissions consistently measure well under permit limit. After the furnaces were rebuilt in 1990, an initial performance test [40 CFR Part 60, §60.8] by an independent test firm was required to demonstrate compliance with the permit limit [PSD-88-3/Modification 2 and Order 88-360/Modification 2, Condition 33]. The results of these tests showed NO_x emissions were within the limits even when tested at high production rates. For example, the No. 4 recovery furnace was vigorously operated at or near the maximum designed steam production rate of 428,000 to 441,000 pounds per hour, and the NO_x emissions from the furnace still met the permit limit. These maximum steam production rates are well <u>outside the normal operating range</u>, which are typically in the range from 350,000 to 380,000 pounds per hour. All subsequent tests in 1995, 2000, and 2004 showed that the average result has been at or less than 75% of the NO_X limit. These subsequent tests were conducted when the steam generation rates were from 368,000 to 373,000 pounds per hour. In Ecology's opinion, emissions indicated a sufficient margin of compliance.
- The combined NO_x emissions for the No. 3 and the No. 4 Recovery Furnaces, during a five-year period, averaged less than 80% of the limit.
- Recovery furnaces are designed to recycle chemicals for the reuse in the wood chip cooking operation, and to recover heat energy from the lignin and uncooked chips. An operation that maximizes the chemical recovery is called the "base-loaded" condition. Any deviation from the base-loaded operation would causes high fuel consumption and less chemical recovery; hence NOx emissions are stable when the mill operates the recovery furnace at based-loaded condition.
- The furnace does not rely on a control device for compliance. There are currently no emission controls for NO_X at the No. 4 Recovery Furnace.
- NO_x CEMS are not a common requirement for recovery furnaces in the mills located in the Pacific Northwest; Ecology's informal survey shows that 12 out of 14 recovery furnaces do not have CEMs and/or periodic testing because both the furnace design and actual operation have prevented wide variability of the NO_X emissions.

Despite the history of consistent compliance with the permit limits, Ecology requires the mill to conduct a new source test for NOx at the No. 3 Recovery Furnace once each permit term to confirm that the emission factors reflect the current operating conditions. The mill must record and report operating conditions of the unit during each testsuch as black liquor solids, auxiliary fuel fired, steam flow rate, and excess oxygen.

Condition A.5 - Total Reduced Sulfur Limit

The furnace has a Total Reduced Sulfur (TRS) limit of 5 ppm corrected to 8% oxygen on a 12-hour average. The mill will use a continuous emission monitor to show compliance with this limit.

Conditions A.6.a and A.6.b - Hazardous Air Pollutants Limits

The mill may show compliance by using particulate as a surrogate for Hazardous Air Pollutants (HAPs). As presented previously under Conditions A.1 and A.2, the pressure drop of the scrubber and the Electro-Static Precipitator's (ESP's) secondary power measure are appropriate monitoring parameters. These performance indicators demonstrate compliant particulate emissions, as required by the federal rule, 40 CFR 63 Subpart MM.

Operation limits selected include:

1. Condition A.6.a: Hourly average of the pressure drop through the wet scrubber will be at least 2 inches of water.
2. Condition A.6.b: Hourly average of the secondary power of the ESP will be at least 40 kilowatts.

Fort James Camas L.L.C. chose to demonstrate compliance with the HAP particulate standard by an emission bubble including the No. 3 and No. 4 Kraft Recovery Furnaces, No. 3 and No. 4 Smelt Dissolvers, and the No. 4 Lime Kiln. The permit allows Fort James to demonstrate compliance using either individual emission standards or an emission bubble. The Fort James roport titled "Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance" dated October 2004, shows the Particulate Bubble Limit Calculations. (See Attachment A in this document.)

B. No. 4 Recovery Furnace

Condition B

<u>Major Changes that Affected Emissions</u>

The No. 4 recovery furnace was installed in 1975. The furnace was designed to reduce the dust and odor emissions from the recovery process. The furnace was converted in 1981 to a lower odor design. A wet (Teller) scrubber was added to the furnace in 1984 to reduce the emissions. The precipitator was rebuilt in 1998 to further control particulate emissions.

The high-volume / low-concentration (HVLC) emissions collection system became operational in April 2005. The HVLC gases can now be incinerated in either the No. 3 Kraft Recovery Furnace or the No. 4 Kraft Recovery Furnace.

Conditions B.1 and B.2 - Opacity and Particulate Limits

The NSPS (standard) for kraft recovery furnaces limits particulate emissions to 0.044 grains of particulates per dry standard cubic foot (gr/DSCF) of product. Ecology concluded that BACT requirements restrict PM_{10} emissions from this furnace to 0.033 gr/DSCF corrected to 8% oxygen.

The mill uses a monthly source test to measure particulate emissions. If the measument is less than 75% of the limit for six consecutive months, the mill may reduced the source test frequency from every month to once every three month (quarterly). The less frequent source testing is allowed only as long as source tests continue to demonstrate emissions are less 75% of the limit.

Secondary power of the ESP must be operated at least 125 kilowatts, the level at which the recovery furnace would comply with the particulate limit. This is a "minimum condition" in the permit.

No. 4 Recovery Furnace is not subject to NSPS, under 40 CFR Part 60, because the cost of the rebuilt was less than 50% of a new, similar sized unit [60.14(a) and 60.15(b)(1)], and particulate and TRS emissions did not increase from the furnace rebuilt. The New Source Performance Standards (NSPS) for a kraft recovery furnace restrict visual emission level to 35% opacity at the stack. Ecology determines that visual emissions will be limited to 20% opacity at the No. 3 Recovery Furnace.

Because the stack plume is wet, an opacity monitor will not work. On March 1, 2004 Fort James Camas installed equipment to measure the secondary voltage and current in each precipitator field. 40 CFR 63 Subpart MM and in particular 63.864 allows the use of a site-specific monitoring plan if the pollution control system makes a continuous opacity monitor technically inappropriate. Fort James submitted a request to use ESP secondary power as an alternative monitoring approach. Ecology approved this site-specific alternative monitoring approach on June 21, 2004. Fort James completed a monitoring study and submitted a report entitled “Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance” on November 2, 2004. This study showed that ESP secondary power and scrubber pressure drop were appropriate monitoring parameters that would indicate continuous compliance at the No. 4 Kraft Recovery Furnace.

Continuous monitoring of the ESP’s secondary power will be used as the compliance indicator for opacity. Hourly averages of the ESP’s secondary power will be at least 125 kilowatts. Method 9 opacity readings may be used if the operational parameter is out of the prescribed operating value. This will override the minimum operational parameters results. As an alternative to the Method 9, the permittee can choose to bring the system back in to the specified minimum operating value within 24 hours.

Condition B.3 - Sulfur Dioxide Limit

Ecology currently restricts sulfur dioxide (SO_2) emissions from kraft recovery furnaces to 500 parts per million corrected to 8% oxygen. Ecology determined that BACT for this furnace limits sulfur dioxide emissions to 10 ppm corrected to 8% oxygen on a 24-hour average. A monthly test, using TRS continuous emission monitor (CEM) (EPA Method 6C) shows compliance. The furnace emissions measured below the limit every month since 1993. Ecology considers the monthly sulfur dioxide test frequency sufficient to indicate continuous compliance.

Ecology requires that the mill records continuously the pH value 7 even though the recovery furnace would not likely be out of compliance between periodic tests. The mill must maintain records of the hourly average pH. Whenever the hourly average pH is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). The mill will record one-hour average excursions, and corrective actions will be reported in the monthly report.

Condition B.4 - Nitrogen Oxides Limit

Oxidation/reduction reactions that occur in a black liquor recovery furnace tend to generate less nitrogen oxides (NO_x) emissions than most other large combustion devices. Careful control of the air-to-fuel ratio as combustion progresses throughout the recovery furnace minimizes formation of NO_x. Because of the design and operation of the furnace, Ecology determined that best available control for NO_x is through good maintenance and operation, as approved during the PSD permitting process in the 1990 mill modernization project. The No. 4 recovery furnace is limited to a NO_x emission rate of 1.5 lbs/ton BLS.

Despite the history of consistent compliance with the permit limits, Ecology requires the mill to conduct a new source test for NOx at the No. 4 recovery furnace once per year to confirm that the emission factors do reflect the current operating conditions of the unit. The mill must also record and report operating conditions of the unit during each test. Those operating conditions include: black liquor solids, auxiliary fuel fired, steam flow rate, and excess oxygen will be recorded.

Refer to Section A.4, No. 3 Recovery Furnace for NO_x periodic monitoring analysis.

Condition B.5 - Total Reduced Sulfur Limit

The furnace has a Total Reduced Sulfur (TRS) limit of 5 ppm on a 12-hour average. A Continuous Emission Monitor (CEM) will be used to measure compliance with this limit.

Condition B.6 - Hazardous Air Pollutants Limits

The mill may show compliance by using particulate as a surrogate for HAPs. As previously presented under Conditions B.1 and B.2, the permittee will monitor the ESP's secondary power as a performance indicator showing that the mill's compliance with particulate emissions as required by the federal rule, 40 CFR 63 Subpart MM. The hourly average of the secondary power of the ESP will be at least 125 kilowatts.

Fort James Camas L.L.C. chose to demonstrate compliance with the HAP particulate standard by an emission bubble including the No. 3 and No. 4 Kraft Recovery Furnaces, the No. 3 and No. 4 Smelt Dissolvers, and the No. 4 Lime Kiln. The permit allows Fort James to demonstrate compliance either using individual emission standards or use of an emission bubble. The permit allows Fort James to demonstrate compliance using either individual emission standards or an emission bubble. The Fort James roport titled "Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance" dated October 2004, shows the Particulate Bubble Limit Calculations. (See Attachment A in this document.)

C. Recovery Furnace Bubble

Condition C

Condition C.1 - Particulate Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit combined annual particulate (PM_{10}) emissions from the No. 3 recovery furnace and No. 4 recovery furnace to 328 tons per year. To show compliance with this limit, the permittee, on a periodic basis, will evaluate the particulate emissions for No. 3 and No. 4 recovery furnaces using actual emissions from stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(A\,\frac{gr}{dscf}\right)\left(B\,\frac{dscf}{\min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(N\,\frac{days}{month}\right)\left(\frac{ton}{2{,}000\ lbs}\right)=C\,\frac{tons\ PM_{10}}{month}$$

A = volumetric grain loading results from the periodic EPA Method 5 or equivalent samplings, average of 3 one-hour runs.

B = dry standard air flow rate in cubic feet per minute during the periodic sampling period

N = number of operating days per month

C = particulate emission rate in tons per month

The mill will record the monthly sum of this value in tons to determine the annual tons per year of PM_{10}.

Condition C.2 - Sulfur Dioxide Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit combined annual sulfur dioxide (SO_2) emissions from the No. 3 recovery furnace and No. 4 recovery furnace to 46.2 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the sulfur dioxide emissions for No. 3 and No. 4 recovery furnaces using actual CEM emissions. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(D\,\frac{ppmvd}{1\ x\ 10^6}\right)\left(B\,\frac{dscf}{\min}\right)\left(\frac{0.166\ lb\ SO_2}{ft^3\ SO_2}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(N\,\frac{days}{month}\right)\left(\frac{1\,ton}{2{,}000\ lbs}\right)=E\,\frac{tons\ SO_2}{month}$$

D = CEM SO_2 concentration based on monthly sample using EPA Method 6C

B = dry standard air flow rate in cubic feet per minute – 6 month average

N = Number of operating days per month

E = SO_2 emission rate in tons per month

The mill will record the monthly sum of this value in tons to determine the annual tons per year of SO_2. The density of sulfur dioxide, 0.166 lb SO_2 per cubic foot of SO_2, is taken from Method 19.

Condition C.3 - Nitrogen Oxides Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit combined annual nitrogen oxide (NO_x) emissions from the No. 3 recovery furnace and No. 4 recovery furnace to 609 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the nitrogen oxide emissions for No. 3 and No. 4 recovery furnaces using an emission factor derived from stack test results. The following algorithm illustrates how the mass loading limit can be estimated:

$$\left(F\,\frac{lb}{Ton\ BLS}\right)\left(G\,\frac{ton\ BLS}{month}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=H\,\frac{ton\ NOx}{month}$$

F = emission factor derived from stack tests using 7E in pounds per ton of Black Liquor Solids

G = black liquor solids burned in each kraft recovery furnace in tons per month

H = nitrogen oxide emission rate in tons per month

The annual NOx emissions are estimated using the following algorithm:

$$\text{Annual NOx emissions}=\left(F\,\frac{lb}{ton\ BLS}\right)\left(\frac{ton\ BLS}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

Condition C.4 - Carbon Monoxide Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, and Order DE-1147 limit annual carbon monoxide (CO) emissions from the No. 3 recovery furnace and No. 4 recovery furnace to 2504 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the carbon monoxide emissions for No. 3 and No. 4 recovery furnaces using an emission factor derived from previous stack test results. The following algorithm illustrates how the mass loading limit can be estimated:

$$\left(I\,\frac{lb}{ton\ BLS}\right)\left(G\,\frac{ton\ BLS}{month}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=J\,\frac{ton\ CO}{month}$$

I = emission factor derived from stack tests using EPA Method 10 in pounds per ton of Black Liquor Solids

G = black liquor solids burned in each kraft recovery furnace in tons per month

J = carbon monoxide emission rate in tons per month

The annual CO emissions are estimated using the following algorithm:

$$\text{Annual CO emissions} = \left(I \frac{lb}{ton\ BLS} \right) \left(\frac{ton\ BLS}{year} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right)$$

Condition C.5 - Volatile Organic Compounds Limit

Order DE-88-360 modification 2, and PSD-88-3 modification 2, limit combined annual volatile organic compounds (VOC) emissions from the No. 3 Recovery Furnace and the No. 4 Recovery Furnace to 219 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the volatile organic compound emissions for No. 3 and No. 4 recovery furnaces using an emission factor derived from stack test results. The following algorithm illustrates how we estimated the mass loading limit:

$$\left(K \frac{lb\ VOC}{ton\ BLS} \right) \left(G \frac{ton\ BLS}{month} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right) = L \frac{ton\ VOC}{month}$$

K = emission factor derived from stack tests using EPA Method 25A in pounds per ton of Black Liquor Solids

G = black liquor solids burned in each kraft recovery furnace in tons per month

L = volatile organic compound emission rate in tons per month

The annual VOC emissions are estimated using the following algorithm:

$$\text{Annual VOC emissions} = \left(K \frac{VOC}{ton\ BLS} \right) \left(\frac{ton\ BLS}{year} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right)$$

Condition C.6 - Total Reduced Sulfur Limit

Order DE-88-360 modification 2, and PSD-88-3 modification 2, limit the combined annual total reduced sulfur (TRS) emissions from the No. 3 Recovery Furnace and the No. 4 Recovery Furnace to 12.7 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the TRS emissions for the No. 3 and No. 4 Recovery Furnaces using actual CEM emissions. The following algorithm illustrates how the mass loading limit is estimated.

$$\left(M \frac{ppmvd}{1\ x\ 10^6} \right) \left(B \frac{dscf}{\min} \right) \left(\frac{0.0883\ lb\ TRS}{ft^3\ TRS} \right) \left(\frac{1{,}440\ \min}{day} \right) \left(N \frac{days}{month} \right) = P \frac{ton}{month}$$

M = CEM TRS concentration measured by a CEM. The monthly average will be calculated based on the average of all the valid 12-hour averages for the month.

B = dry standard air flow rate in cubic feet per minute – 6 month average

N = number of operating days per month

P = TRS emission rate in tons per month

The mill will record the monthly sum of this value in tons to determine the annual tons per year of TRS emissions. The density of total reduced sulfur, 0.0833 lbs per cubic foot of TRS, is based on a molecular weight of 34 pounds per pound-mole and an ideal gas volume at standard conditions of 385 cubic feet per lbs mol.

D. No. 3 Smelt Dissolver Tank

Condition D

<u>Major Changes that Affected Emissions</u>

The No. 3 Smelt Dissolver was modified in 1991. A packed-bed scrubber was installed on the dissolver tank vent to control particulate and odor emissions.

Conditions D.1and D.2 - Opacity and Particulate Limits

The NSPS for the smelt dissolvers limit particulate emissions to 0.2 lbs per ton black liquor solids (BLS) fired at the associated recovery furnace. Ecology concluded that BACT requirements restrict PM_{10} emissions from this dissolver to 0.12 lbs/ton BLS. Particulate limit compliance is monitored monthly using a source test. The permittee may reduce this testing frequency to quarterly if actual emissions measure less than 75% of the permit limit for six consecutive months. Less-frequent source testing is allowed only so long as source tests continue to demonstrate that actual emissions measure less than 75% of the limit.

The scrubber minimizes the particulate emissions to levels within the permit limits; thus, Ecology places scrubber operational conditions in the permit to show that the pollution control device is operating. Fort James completed a monitoring study and submitted a report entitled "Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance" on November 2, 2004. This study showed that scrubbing liquid flow rate, pressure drop, and pH are appropriate monitoring parameters to indicate continuous compliance at the No. 3 Smelt Dissolver. The scrubbing liquid flow rate, pressure drop, and pH will be monitored continuously as the compliance indicator. The hourly averages of the flow rate, pressure drop, and pH will be at least 2000 gallons per minute, 3 inches of water, and 9, respectively.

Visual emissions will be limited to 20 percent opacity at the stack. Because the plume is wet, an opacity monitor will not work. Therefore, continuous minimum operational parameters for opacity monitoring were placed in the regulatory order [WAC 173-405-072(3)(b)]. The parameters are the same minimum operating conditions as described above for particulate. Ecology may request the permittee to conduct EPA Method 9 to verify the compliance of opacity of the emission unit if the minimum operational parameter is out of the prescribed operating value. The permittee must bring the system back in to the prescribed minimum operating value within 24 hours.

Condition D.3 - Total Reduced Sulfur Limit

The NSPS for smelt dissolvers limit TRS emissions (measured as H_2S) to 0.033 lbs per ton black liquor solids (BLS) fired at the associated recovery furnace. Ecology concluded that BACT requirements restrict TRS emissions from this dissolver to 0.0168 pounds per ton BLS. Order DE-88-360 and PSD-88-3 require the permittee to monitor, record, and report the pressure drop, the scrubber recirculation flow rate, and the scrubbing liquor's pH. Compliance with the TRS limit will be achieved when the process parameters fall within the specified limits, 0.0168 pounds per ton.

Ecology requires TRS be measured using EPA Method 16A/6C. According to 40 CFR § 60.283(a)(4), the reference test method required is Method 16 for use to measure TRS emissions except as provided by 40 CFR § 60.285(f)(2) (Method 16A or 16B may be used if the sampling time is 60 minutes).

In August 1996 the Office of Air Quality Planning and Standards of EPA in Research Triangle Park approved Method 16A/6C for use to measure TRS at the brown stock washer at Fort James. Please refer to the letter dated August 27, 1996 from William F. Hunt of the Emissions, Monitoring, and Analysis Division. The approval was based on an assertion that the performance of the Method 16A sampling system can be determined more efficiently on site using an instrument analytical finish (Method 6C). Ecology requires the mill to continue using this method.

Condition D.4 - Hazardous Air Pollutants Limit

The mill may demonstrate compliance by using particulate as a surrogate for HAPS. As allowed under Conditions D.1 and D.2, the pressure drop, the scrubber recirculation flow rate, and the scrubbing liquor's pH are monitored continuously as performance indicators; they demonstrate compliant particulate emissions, as required by 40 CFR 63, Subpart MM.

Selected operation limits include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 3 inches of water.
2. Hourly average of the flow rate through the first stage of the scrubber will be at least 2000 gallons per minute.
3. Hourly average of the pH of the scrubber liquor will be at least 9.

Fort James Camas L.L.C. chose to demonstrate compliance with the HAP particulate standard by an emission bubble including the No. 3 and No. 4 Kraft Recovery Furnaces, No. 3 and No. 4 Smelt Dissolvers, and the No. 4 Lime Kiln. The permit allows Fort James to demonstrate compliance using either individual emission standards or an emission bubble. The Fort James roport titled "Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance" dated October 2004, shows the Particulate Bubble Limit Calculations. (See Attachment A in this document.)

E. No. 4 Smelt Dissolver

Condition E

Conditions E.1 and E.2 - Opacity and Particulate Limits

The mill uses a monthly source test to measure particulate emissions. If the measument is less than 75% of the limit for six consecutive months, the mill may reduced the source test frequency from every month to once every three month (quarterly). The less frequent source testing is allowed only as long as source tests continue to demonstrate emissions are less 75% of the limit.

The scrubber minimizes the particulate emissions to levels within the permit limits; thus, Ecology requires scrubber operational conditions in the permit to show that the pollution control device is operating. Fort James completed a monitoring study and submitted a report entitled "Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance" on November 2, 2004. This study showed that scrubbing liquid flow rate, pressure drop, and pH are appropriate monitoring parameters that would indicate continuous compliance at the No. 4 Smelt Dissolver. The scrubbing liquid flow rate, pressure drop, and pH will be monitored continuously as the compliance indicator. The hourly averages of the flow rate, pressure drop, and pH will be at least 2000 gallons per minutes, 7.5 inches of water, and 9, respectively.

The permittee limits visual emissions to 20 percent opacity at the stack. Because the plume is wet, an opacity monitor will not work. So, Ecology placed continuous minimum operational parameters for opacity monitoring in the regulatory order [WAC 173-405-072(3)(b)]. The parameters are the same minimum operating conditions as described above for particulate. Ecology may request the permittee to conduct EPA Method 9 to verify the compliance of opacity of the emission unit if the minimum operational parameter is out of the specified operating value. The permittee must bring the system back in to the prescribed minimum operating value within 24 hours.

Condition E.3 - Total Reduced Sulfur Limit

The NSPS requirements for smelt dissolvers limit TRS emissions (measured as H_2S) to 0.033 lbs per ton black liquor solids (BLS) fired at the associated recovery furnace. Ecology concluded that BACT rules restrict TRS emissions from this dissolver to 0.0168 lbs/ton BLS. Order DE-88-360 and PSD-88-3 require monitoring, recording, and reporting of the pressure drop, the scrubber recirculation flow rate, and the scrubbing liquor's pH. When the process parameters fall within the prescribed limits, compliance with the TRS limit of 0.0168 pounds per ton will be achieved.

Condition E.4 - Hazardous Air Pollutants Limits

The mill may demonstrate compliance by using particulate as a surrogate for HAPS. As allowed under Conditions E.1 and E.2, the pressure drop, the scrubber recirculation flow rate, and the scrubbing liquor's pH are monitored continuously as performance indicators; they demonstrate compliant particulate emissions, as required by 40 CFR 63 Subpart MM.

Operation limits selected include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 3 inches of water.
2. Hourly average of the flow rate through the first stage of the scrubber will be at least 2000 gallons per minute.
3. Hourly average of the pH of the scrubber liquor will be at least 9.

Fort James Camas L.L.C. has selected to demonstrate compliance with the HAP particulate standard by an emission bubble including the No. 3 and No. 4 Kraft Recovery Furnaces, No. 3 and No. 4 Smelt Dissolvers, and the No. 4 Lime Kiln. The permit allows Fort James to demonstrate compliance using either individual emission standards or an emission bubble. The Fort James roport titled "Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance" dated October 2004, shows the Particulate Bubble Limit Calculations. (See Attachment A in this document.)

F. Kraft Smelt Dissolver Bubble

Condition F

Condition F.1 - Particulate Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit combined annual particulate (PM_{10}) emissions from the No. 3 Smelt Dissolver Tank Vent and the No. 4 Smelt Dissolver Tank Vent to 47.8 tons per year. To show compliance with this limit, the permittee, on a periodic basis, will evaluate the particulate emissions for the No. 3 and the No. 4 Smelt Dissolver Tank Vents using actual emissions from previous stack test results. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{1\,lb}{7{,}000\,gr}\right)\left(\frac{60\ \min}{hour}\right)\left(\mathrm{C}\,\frac{hour}{ton\ BLS}\right)\left(\mathrm{D}\,\frac{ton\ BLS}{month}\right)=\mathrm{E}\,\frac{ton\ TSP}{month}$$

A = volumetric grain loading results from the periodic* WDOE Method 8 or equivalent samplings, average of 3 one-hour runs.

B = dry standard air flow rate in cubic feet per minute during the periodic sampling period

C = black liquor solids (BLS) throughput in tons per hour during monthly* tests

D = BLS throughput in tons per month

E = total suspended particulate (TSP) emission rate in tons per month

PM_{10} conversion factor is applied to compute the required PM_{10} emission rate. The following algorithm is used to illustrate how the PM_{10} is estimated:

$$\left(E\ \frac{ton\ \ TSP}{month} \right)\left(F\ \frac{ton\ \ PM_{10}}{ton\ \ TSP} \right) = G\ \frac{ton\ \ PM_{10}}{month}$$

F = PM_{10} conversion factor derived from actual test data

G = PM_{10} emission rate in tons per month

Condition F.2 - Sulfur Dioxide Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit combined annual sulfur dioxide (SO_2) emissions from the No. 3 Smelt Dissolver Tank Vent and the No. 4 Smelt Dissolver Tank Vent to 28 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the sulfur dioxide emissions for the No. 3 and the No. 4 Smelt Dissolver Tank Vents using an emission factor derived from previous stack test results. We used the following algorithm to estimate the mass limit:

$$\left(H\,\frac{lb\ SO_2}{ton\ BLS} \right)\left(D\,\frac{ton\ BLS}{month} \right)\left(\frac{1\ ton}{2{,}000\ lbs} \right) = I\,\frac{ton\ SO_2}{month}$$

H = emission factor derived from a previous stack test in lb per ton black liquor solids. Emissions will be measured using EPA Method 6C.

D = black liquor solids throughput in tons per month

I = sulfur dioxide emission rate in tons per month

The annual SO2 emissions are estimated using the following algorithm:

$$\text{Annual } SO_2 \text{ emissions} = \left(F\,\frac{lb\ SO_2}{ton\ BLS} \right)\left(\frac{ton\ BLS}{year} \right)\left(\frac{1\ ton}{2{,}000\ lbs} \right)$$

Condition F.3 - Volatile Organic Compounds Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit combined annual volatile organic compounds (VOC) emissions from the No. 3 Smelt Dissolver Tank Vent and the No. 4 Smelt Dissolver Tank Vent to 30 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the volatile organic compound emissions for the No. 3 and the No. 4 Smelt Dissolver Tank Vents using an emission factor derived from previous stack test results. We used the following algorithm to estimate the mass limit:

$$\left(J\,\frac{lb\ VOC}{ton\ BLS} \right)\left(D\,\frac{ton\ BLS}{month} \right)\left(\frac{1\ ton}{2{,}000\ lbs} \right) = K\,\frac{ton\ VOC}{month}$$

J = emission factor derived from a previous stack test using EPA Reference Method 25A in pounds per ton Black Liquor Solids

D = black liquor solids through put in tons per month

K = volatile organic compound emission rate in tons per month

The annual VOC emissions are estimated using the following algorithm:

$$\text{Annual VOC emissions} = \left(J\,\frac{lb\ VOC}{ton\ BLS} \right)\left(\frac{tons\ BLS}{year} \right)\left(\frac{1\ ton}{2{,}000\ lbs} \right)$$

Condition F.4 - Total Reduced Sulfur Limit

Order DE-88-360 modification 2, and PSD-88-3 modification 2, limit the combined annual total reduced sulfur (TRS) emissions from the No. 3 Smelt Dissolver Tank Vent and the No. 4 Smelt Dissolver Tank Vent to 5.4 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the TRS emissions for No. 3 and the No. 4 Smelt Dissolver Tank Vents using an emission factor derived from previous stack test results. We used the following algorithm to estimate the mass limit:

$$\left(L\,\frac{lb\ TRS}{ton\ BLS}\right)\left(D\,\frac{ton\ BLS}{month}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=M\,\frac{ton\ TRS}{month}$$

L = emission factor derived from stack tests using EPA Method 16A/16C in lb per ton Black Liquor Solids

D = black liquor solids through put in tons per month

M = TRS emission rate in tons per month

The annual TRS emissions are estimated using the following algorithm:

$$\text{Annual TRS emissions}=\left(L\,\frac{lb\ TRS}{ton\ BLS}\right)\left(\frac{ton\ BLS}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

G. No. 4 Lime Kiln

Condition G

The No. 4 lime kiln started in operation in July 1979. It replaced three older kilns. During the mill's Recovery and Modernization project from 1989 to 1991, no changes in the design and operation of the lime kiln occurred, other than to increase the operating rate by a factor of 1.03, to reflect the increased plant capacity. This production change resulted in an estimated 3 percent increase in emissions from this source. Emission control includes a venturi scrubber on the kiln stack for particulate control and operational practices to control other emissions. A CEMS is used to measure TRS emissions.

Conditions G.1, G.2, and G.3 - Particulate and Opacity Limits

The mill uses a monthly source test to measure particulate emissions. If the measument is less than 75% of the limit for six consecutive months, the mill may reduced the source test frequency from every month to once every three month (quarterly). The less frequent source testing is allowed only as long as source tests continue to demonstrate emissions are less 75% of the limit.

A set of processes known as "causticizing" and "slaking" convert green liquor to white liquor. The residue, known as lime mud, is washed, pumped to drum filters for dewatering, and then conveyed into the kiln feed end. Process heat is generated by the combustion of residual fuel oil or natural gas causes the lime kiln product, calcium oxide (CaO), to react with the green liquor. The reaction converts the sodium carbonate (Na_2CO_3) to sodium hydroxide (NaOH), thus forming white liquor (also referred to as active alkali). Emissions are controlled by a Ducon rectangular cross-section variable throat venturi scrubber.

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual particulate (PM_{10}) emissions from *natural gas* combustion in the No. 4 lime kiln to 44 tons per year. The mill uses a monthly source test to measure particulate emissions. If the measument is less than 75% of the limit for six consecutive months, the mill may reduced the source test frequency from every month to once every three month (quarterly). The less frequent source testing is allowed only as long as source tests continue to demonstrate emissions are less 75% of the limit. We used the following algorithm to estimate the mass limit:

$$\left(A\,\frac{gr}{dscf}\right)\left(B\,\frac{dscf}{\min}\right)\left(\frac{1\,lb}{7{,}000\;gr}\right)\left(\frac{1{,}440\;\min}{day}\right)\left(C\,\frac{days}{ADT}\right)\left(D\,\frac{ADT}{year}\right)\left(\frac{1\,ton}{2{,}000\;lbs}\right)=E\,\frac{ton\;PM_{10}}{year}$$

A = volumetric grain loading results from the periodic* WDOE Method 8 or equivalent samplings, average of 3 one-hour runs with the lime kiln firing natural gas

B = dry standard air flow rate in cubic feet per minute during the periodic sampling period with the lime kiln firing natural gas

C = kraft pulp production in ADT per day during the monthly sampling period with the lime kiln firing natural gas

D = total kraft pulp production in ADT per year

E = particulate emission rate in tons per year when firing natural gas

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual particulate (PM_{10}) emissions from *fuel oil* combustion in the No. 4 lime kiln to 88 tons per year. To show compliance with this limit, the permittee, on a monthly* basis, will evaluate the particulate emissions for the No. 4 lime kiln using actual emissions from previous stack test results. Provision for frequency reduction to quarterly is made if emissions are <75% of the limit for six consecutive months. Less frequent source testing is allowed only as long as source tests continue to demonstrate emissions are <75% of the limit. We used the following algorithm to estimate the mass limit:

$$\left(A\,\frac{gr}{dscf}\right)\left(B\,\frac{dscf}{\min}\right)\left(\frac{1\,lb}{7{,}000\;gr}\right)\left(\frac{1{,}440\;\min}{day}\right)\left(C\,\frac{days}{ADT}\right)\left(D\,\frac{ADT}{year}\right)\left(\frac{1\,ton}{2{,}000\;lbs}\right)=E\,\frac{ton\;PM_{10}}{year}$$

A = volumetric grain loading results from the periodic* WDOE Method 8 or equivalent samplings, average of 3 one-hour runs with the lime kiln firing fuel oil

B = dry standard air flow rate in cubic feet per minute during the periodic sampling period with the lime kiln firing fuel oil

C = kraft pulp production in ADT per day during the monthly sampling period with the lime kiln firing fuel oil

D = total kraft pulp production in ADT per year

E = particulate emission rate in tons per year when firing fuel oil

The scrubber minimizes the particulate emissions to levels within the permit limits; thus, Ecology requires scrubber operational conditions in the permit to show that the pollution control device is operating. Fort James completed a monitoring study and submitted a report entitled “Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance” on November 2, 2004. This study showed that scrubbing liquid flow rate and pressure drop are appropriate monitoring parameters that would indicate continuous compliance at the No. 4 Lime Kiln. The scrubbing liquid flow rate and pressure drop will be monitored continuously as the compliance indicator. The hourly averages of the flow rate and pressure drop will be at least 380 gallons per minutes and 24 inches of water, respectively.

Visual emissions will be limited to 35 percent opacity at the stack. Because the plume is wet, an opacity monitor will not work. Therefore, Ecology placed continuous minimum operational parameters for opacity monitoring [WAC 173-405-072(3)(b)] in the regulatory order. The parameters are the same as the minimum operating conditions as described above for particulate. The hourly averages of the flow rate and pressure drop will be at least 380 gallons per minute and 24 inches of water, respectively. Ecology may request the permittee conduct EPA Method 9 to verify the compliance of opacity of the emission unit if the minimum operational parameter is out of the prescribed operating value. The permittee must bring the system back in to the prescribed minimum operating value within 24 hours.

Condition G.4 - Sulfur Dioxide Limits

The Department limits SO_2 from a lime kiln to 500 ppm corrected to 10 percent oxygen (Chapter 173-405 WAC). The venturi scrubber is effective at removing the major pollutants of concern including particulate, TRS, and SO_2.

The permit requires the permittee to measure the emissions monthly using a TRS CEM. Test results are reported to the Department in the Kraft Mill Air Monitoring Report. The test results are used to compute the annual emissions.

Condition G.5 - Sulfur Dioxide Limits

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual sulfur dioxide (SO_2) emissions from the No. 4 lime kiln to 36.1 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the sulfur dioxide emissions for No. 4 lime kiln using actual CEM emissions. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{F}\,\frac{ppmvd}{1\ x\ 10^{6}}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{0.166\ lb\ SO_2}{ft^3\ SO_2}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(\mathrm{N}\,\frac{days}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{G}\,\frac{ton\ SO_2}{year}$$

F = CEM SO_2 concentration based on monthly sample using EPA Method 6C

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period - 6 month average

N = number of operating days per year

G = SO_2 emission rate in tons per year

The density of sulfur dioxide, 0.166 lb SO_2 per cubic foot of $SO_{2,}$ is taken from Method 19.

Conditions G.6, G.7, and G.8 -
Nitrogen Oxides, Carbon Monoxide and Volatile Organic Compounds

Condition G.6 - Nitrogen Oxides Limit

Order DE-88-360 modification 2, and PSD-88-3 modification 2, limit annual nitrogen oxide (NO_x) emissions from the No. 4 lime kiln to 234 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the nitrogen oxide emissions for No. 4 lime kiln using an emission factor derived from stack test results. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{F}\,\frac{lb\ NOx}{ton\ CaO}\right)\left(\mathrm{G}\,\frac{ton\ CaO}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{H}\,\frac{ton\ NOx}{year}$$

F = emission factor derived from stack tests in lb per ton Calcium Oxide throughput

G = lime kiln calcium oxide throughput in tons per year

(A conversion factor to convert ADT to tons of CaO is used)

H = nitrogen oxide emission rate in tons per year

Annual NOx emissions in 2003 and 2004 were 80.66 tons per year and 76.80 tons per year, respectively. These are well within the annual mass limits. Despite a history of consistent compliance with the permit limits, Ecology is requiring a new source test for NOx at the lime kiln once each permit term to ensure that the emission factors reflect the current condition of the unit. The mill is required to record and report operating conditions of the unit during each test. Operating conditions (lime mud flow rate, auxiliary fuel fired, and excess oxygen) will be recorded during the test.

Condition G.7 - Carbon Monoxide Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual carbon monoxide (CO) emissions from the No. 4 lime kiln to 1,798 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the carbon monoxide emissions for No. 4 lime kiln using an emission factor derived from stack test results. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{I}\,\frac{lb\ CO}{ton\ CaO}\right)\left(\frac{ton\ CaO}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{J}\,\frac{ton\ CO}{year}$$

I = emission factor derived from stack tests in lb per ton Calcium Oxide.

G = lime kiln calcium oxide throughput in tons per year
(A conversion factor to convert ADT to tons of CaO is used)

J = carbon monoxide emission rate in tons per year.

Condition G.8 - Volatile Organic Compounds Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual volatile organic compounds (VOC) emissions from the No. 4 lime kiln to 45 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the volatile organic compound emissions for No. 4 lime kiln using an emission factor derived from stack tests. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{K}\,\frac{lb\ VOC}{ton\ CaO}\right)\left(\mathrm{G}\,\frac{ton\ CaO}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{L}\,\frac{ton\ VOC}{year}$$

K = emission factor derived from stack tests using EPA Method 25A in lb per Calcium Oxide

G = lime kiln calcium oxide throughput in tons per year
(A conversion factor to convert ADT to tons of CaO is used)

L = volatile organic compound emission rate in tons per year

Condition G.10 - Total Reduced Sulfur Limit

TRS limit compliance is continuously monitored using a CEM system. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{M}\,\frac{ppmd}{1\ x\ 10^6}\right)\left(\mathrm{B}\,\frac{dscf}{min}\right)\left(\frac{0.0883\ lb\ TRS}{ft^3\ TRS}\right)\left(\frac{1{,}440\ \ min}{day}\right)\left(\mathrm{N}\,\frac{days}{month}\right)\left(\frac{1\ ton}{2{,}000\ lb}\right)=\mathrm{O}\,\frac{ton\ TRS}{month}$$

M = TRS concentration measured by a CEM using EPA Method 16 or 16A. The monthly average will be calculated based on the average of all the valid 12-hour averages for the month.

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period

O = TRS emission rate in tons per month

The mill will record the monthly sum of this value in tons to determine the annual tons per year of TRS emissions. The density of total reduced sulfur, 0.0833 lbs per cubic foot of TRS, is based on a molecular weight of 34 pounds per pound-mole and an ideal gas volume at standard conditions of 385 cubic feet per pound-mole.

Condition G.11 Hazardous Air Pollutants Limits

The mill may demonstrate compliance by using particulate as a surrogate for HAPS.   As allowed under Conditions G.1 and G.2, the pressure drop and the scrubber recirculation flow rate are monitored continuously as performance indicators; they demonstrate compliant particulate emissions, as required by 40 CFR 63 Subpart MM.

Operation limits selected include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 24 inches of water.
2. Hourly average of the flow rate through the first stage of the scrubber will be at least 380 gallons per minute.

Fort James Camas L.L.C. has selected to demonstrate compliance with the HAP particulate standard by an emission bubble including the No. 3 and No. 4 Kraft Recovery Furnaces, No. 3 and No. 4 Smelt Dissolvers, and the No. 4 Lime Kiln. The permit allows Fort James to demonstrate compliance using either individual emission standards or an emission bubble. The Fort James roport titled “Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance” dated October 2004, shows the Particulate Bubble Limit Calculations. (See Attachment A in this document.)

Condition G.12 - Total Reduced Sulfur Limits (state-only)

WAC 173-405-040(3)(b) limits total reduced sulfur (TRS) emission concentrations from the No. 4 lime kiln to 80 parts per million corrected to 10 percent oxygen for a period of two consecutive hours. 40 CFR 60.283(a)(5) limits TRS emission concentrations from the No. 4 lime kiln to 8 parts per million corrected to 10 percent oxygen. As identified in Order DE-88-360 modification 2 and PSD-88-3 modification 2, Fort James will operate a continuous emission monitor for TRS on the lime kiln (with a range of 0 to 30 ppmvd) to show compliance with the 8 ppmvd limit. Fort James will use the results of this monitoring to show compliance with the 80 ppmvd limit as well. Readings at or below 30 ppmvd will be considered in compliance with the 80 ppmvd limit.

H. No. 5 Power Boiler

Condition H

In September 2004 the mill converted the Magnefite Recovery Furnace into No. 5 Power Boiler. Prior to the conversion, the furnace was designed to operate as a Magnefite sulfite chemical recovery furnace. In October 2001, the sulfite process at the mill was shutdown. Subsequently, the unit was converted to a power boiler subject to meet the new source review as required by WAC 173-400-110, New Source Review Regulations. The boiler combusts the odorous gases from the kraft pulping processes; i.e., NCG and stripper-off gases. The mill incorporated low-NOx burners into the boiler, which also has as pollution controls an over-fired air (staging) system and a flue gas recirculation system and a series of scrubbers. The scrubbers include a preconditioning NCG scrubber prior to the NCG gases entering the boiler. The venturi scrubber removes particulate matter and a packed-bed scrubber to remove sulfur dioxide from the boiler exhaust.

Conditions H.1, H.2, and H.3 - Opacity and Particulate Limits

The mill uses a monthly source test to measure particulate emissions. If the measument is less than 75% of the limit for six consecutive months, the mill may reduced the source test frequency from every month to once every three month (quarterly). The less frequent source testing is allowed only as long as source tests continue to demonstrate emissions are less 75% of the limit. The particulate limit is 0.0164 gr/dscf at 8% excess oxygen, hourly average (average of 3 one-hour runs).

Visual emissions will be limited to 20 percent opacity at the stack. Because the plume is wet, an opacity monitor will not work. Therefore, the regulatory order requires continuous minimum operational parameters for opacity monitoring [WAC 173-405-072(3)(b)]. During the boiler's Initial Performance Tests and Shakedown Emission testing, Fort James recorded venturi scrubber parameters were recorded. Ecology selected minimum operating conditions for pressure drop and scrubbing liquid flow rate at the venturi scrubber, based on these tests. The hourly averages of the flow rate and pressure drop will be at least 520 gallons per minute and 22.0 inches of water, respectively. If the minimum operational parameter is out of the specified operating value, Ecology may require the permittee to conduct EPA Method 9 to verify the compliance of opacity. The permittee shall bring the system back in to the specified minimum operating value within 24 hours.

The order limits annual particulate (PM_{10}) emissions from the No. 5 power boiler to 36.7 tons per year. To show compliance with this limit, the permittee, on a monthly basis, must evaluate the particulate emissions for the boiler using actual emissions from actual stack test results. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(\mathrm{N}\,\frac{days}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{C}\,\frac{ton\ PM}{year}$$

A = volumetric grain loading results from the periodic RM 5 average of 3 one-hour runs.
B= dry standard air flow rate in cubic feet per minute during the periodic sampling period
N = number of operating days per year
C = particulate emission rate in tons per year

Condition H.4 - Sulfur Dioxide Concentration Limit

The concentration limit for sulfur dioxide (SO_2) is 16.6 ppm corrected to 7% oxygen. The limit compliance is monitored using a CEMS (EPA Method 6c).

The packed-bed scrubber minimizes the SO_2 emissions to levels within the permit limits; thus, Ecology requires scrubber operational conditions in the permit to show that the pollution control device is operating. The scrubbing liquid flow rate will be monitored continuously. The hourly averages of the scrubber flow rate will be at least 1800 gallons per minutes.

Condition H.5 - Sulfur Dioxide Mass Limit

Order DE-1147 limits annual sulfur dioxide (SO_2) emissions from the unit to 48.6 tons per year. To show compliance with this limit, the permittee, on a monthly basis, must evaluate the SO_2 emissions for the boiler using actual CEM measurement. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{D}\,\frac{ppmvd}{1\ x\ 10^6}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{0.166\ lb\ SO_2}{ft^3\ SO_2}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(N\,\frac{days}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{E}\,\frac{ton\ SO_2}{year}$$

D = CEM SO_2 concentration measured by a CEM using EPA Method 16. The monthly average will be calculated based on the average of all the valid 24-hour averages for the month
B = dry standard air flow rate in cubic feet per minute during the periodic sampling period
N = number operating days per year
E = SO_2 emission rate in tons per year

Conditions H.6, H. 7, H.8, and H.9 -

Nitrogen Oxides, Carbon Monoxide, Volatile Organic Compounds

Condition H.6 - Nitrogen Oxides Limit

Order DE-1147-AQ04 limits annual nitrogen oxide (NO_x) emissions from the No. 5 power boiler to 99.2 pounds per hour or 434.5 tons per year. In addition to the low-NO_X burners, NO_X emission controls at the boiler include an air staging system, and a FGR (flue gas recirculation) system. To show compliance with this limit, the permittee presented a NO_x Control Compliance Assurance Monitoring Plan as required by 40 CFR Part 64 for a flue gas recirculation system. Extensive testing of the boiler with NO_x and CO continuous emission monitors for approximately 30 days allowed the permitted to develop a parametric emission model for computing NO_x emissions. This statistical model is based on monitoring process and control equipment parameters and will be used to calculate hourly NO_x emissions from the boiler. The hourly emissions will be summed each month and submitted with the monthly Power Boiler Air Monitoring report. The monthly emissions will be summed to derive the annual emissions for the boiler. The mill will use the following algorithm:

NO_x lbs/hour = 0.379* steam rate, kpph + 5.796*boiler excess O_2, % + 0.341* flue gas recirculation (FGR) + 0.4313 * fuel oil firing rate + 0.02749* SOG flow rate, acfm – 0.0006318* NCG flow rate, cfm – 70.12

Where,

Steam Rate = steam generation in thousands of pounds per hour (kpph).

Boiler Excess Oxygen = excess oxygen in percent (%).

Flue Gas Recirculation Rate in thousands of pounds per hour (kpph).

Fuel Oil Firing Rate is in gallons per minute (gpm) Stripper Off-Gas (SOG) flow rate in actual cubic feet per minute (acfm).

Non-Condensible Gas (NCG) flow rate is in cubic feet per minute (cfm).

The validity of the parametric emission modeling equation will be verified annually with a NO_x continuous emission monitor. Acceptance criteria has been defined as a relative accuracy less than or equal to 20%.

Conditions H.7 and H.8 - Carbon Monoxide Limit

Order DE-1147-AQ04 limits annual carbon monoxide (CO) emissions from the No. 5 power boiler to 264.6 tons per year. CO controls at the boiler include an over-fired air system and a flue gas recirculation (FGR) system. To show compliance with this limit, the permittee presented a proposal to use emission factors derived from actual stack test results.

CO was shown to vary with steam flow rate. The CO emissions expressed as lbs/MMBtu will be recorded on an hourly basis and calculated as a 30 day running rolling average. The mass emission rates will be calculated hourly and summed each month and submitted with the monthly Power Boiler Air Monitoring report. The monthly emissions will be summed to derive the annual emissions for the boiler. The mill will use the following emission factors:

Steam Flow Rate, lbs/hour	CO Emissions, lbs/MMBtu
117,000 to 258,000	0.01
71,000 to 117,000	0.06
Less than 71,000	0.22

The validity of the CO emission factors will be verified annually with a CO continuous emission monitor.

Condition H.9 - Volatile Organic Compounds Limit

VOC emissions plummeted 94% after the conversion even though the boiler capacity was reduced less than 10%. Order DE-1147-AQ04 limits annual volatile organic compounds (VOC) emissions from the No. 5 power boiler to 8.8 tons per year. To show compliance with this limit, the permittee, on an annual and monthly basis, will evaluate the volatile organic compound emissions for the boiler using an emission factor derived from actual stack test results.

Based on the emission and process data obtained during testing from October 13, 2004 to May 3, 2005 the following emission factors were developed with different factors depending upon whether the boiler was firing natural gas or co-firing with natural gas and No. 6 fuel oil.

Steam Flow Rate, lbs/hour	VOC Emission Factor,ppm while firing natural gas	VOC Emission Factor,ppm while co-firing
210,000 to 258,000	1.0	16.0
117,000 to 210,000	1.0	14.0
83,000 to 117,000	2.3	8.0
71,000 to 83,000	2.3	7.0
Less than 71,000	2.3	28.0

The permittee developed an equation to calculate stack flows based on steam rate and boiler excess oxygen. The stack flow correlation equation is:

Stack flow, dscfm = 241.6 * steam rate, kpph + 2393.9 * boiler excess O_2 - 9289

Where,

Steam Rate = steam generation in thousands of pounds per hour (kpph).

Boiler Excess Oxygen = excess oxygen in percent (%).

The above stack flow equation and VOC emission factors will be used to calculate the VOC mass loading. The mass emission rates will be calculated and summed each month and submitted with the monthly Power Boiler Air Monitoring report. The monthly emissions will be summed to derive the annual emissions for the boiler.

Condition H.10 – Total Reduced Sulfur Limit

Order DE-1147-AQ04 limits annual TRS emissions from the No. 5 power boiler to 8.8 tons per year.

The mill derived the following emission factors using the emission and process data obtained during testing from October 13, 2004 to May 3, 2005:

Steam Flow Rate, lbs/hour	TRS Emission Factor, ppm
83,000 to 258,000	0.6
65.7 to 83,000	2.4

The permittee developed an equation to calculate stack flows based on steam rate and boiler excess oxygen. The stack flow correlation equation is:

Stack flow, dscfm = 241.6 * steam rate, kpph + 2393.9 * boiler excess O_2 - 9289

Where,

Steam Rate = steam generation in thousands of pounds per hour (kpph).

Boiler Excess Oxygen = excess oxygen in percent (%).

The above stack flow equation and TRS emission factors will be used to calculate the TRS mass loading. The mass emission rates will be calculated and summed each month and submitted with the monthly Power Boiler Air Monitoring report. The permittee will record monthly emissions and sum them to derive the annual emissions for the boiler.

Condition H.11 - Operation Limits

Particulate control is accomplished through the use of the venturi scrubber. Particulate limit compliance is monitored with a monthly source test. Because the stack plume is wet, an opacity monitor will not work. To address the continuous compliance requirement, Ecology requires the permittee to employ continuous monitoring of the pressure drop and scrubbing liquid flow rate through the venturi scrubber as the compliance indicator for particulate and opacity. The scrubber parameters were determined during the unit's initial performance test per 40 CFR Part 60, §60.8. The hourly averages of the pressure drop through the venture scrubber and the flow rate will be at least 22.0 inches of water and 520 gallons per minutes, respectively. In addition, the hourly average of the flow rate through the packed bed scrubber will be at least 1800 gpm. This minimum flow is necessary for wetting of the packed-bed scrubber to remove sulfur dioxide.

The use of these scrubber parameters as a measure of control device performance is consistent both with U.S. EPA's Region X interpretation of the applicability of periodic monitoring and with the intent of the Compliance Assurance Monitoring Rule (40 CFR Part 64). Whenever the parameter is less than the specified operating value, the permittee shall take corrective action within 24 hours.

Condition H.12 - Loading Limits

Fort James uses the boiler as the swing boiler for the mill – steam demands vary in a wide range, Ecology required that the emission tests bracket the expected range of boiler operation. These tests, therefore, were designed to be run near the maximum combustion rate (MCR) of the boiler, where the boiler generates 258,000 lb/hour of steam, and at the expected low range of the boiler which is approximately 77,400 lbs/hour steam (30 percent MCR).

Fort James used an independent tester to conduct initial peformance tests on March 15, 2005, with 100% MCR while co-firing natural gas and No. 6 fuel oil. On May 3, 2005, the tester conducted tests on the boiler when low firing rate/steam demand was low at about 30% MCR while firing only natural gas. During the initial performance tests, the boiler was burning the mill's noncondensible gases (NCGs) and stripper off-gases (SOGs) at the intended rates. These emission tests demonstrate the following:

1. When the mill operated the the boiler firing both on natural gas and No. 6 fuel oil, emissions were in compliance with all applicable limits when the boiler was generating steam within the ranges of 117,000 to 258,000 lbs/hour.

2. When Fort James operated the boiler firing natural gas and at a steam generation rate of about 30 percent of the MCR; i.e., averaging at 83,500 lbs/hour, emissions were in compliance with all applicable limits.

3. While the mill co-fired natural gas and No. 6 fuel oil (with the NCGs and SOGs) at low steam generation rates, the tests on February 21, 2005, demonstrated compliance with the emission limits. On the other hand, the tests conducted on March 16 and March 17, 2005, showed carbon monoxide and particulate levels slightly higher than the emission limits. The mill conducted an inspection of the oil burners after the March 16-17 tests, they found that the packing glands on the oil burners were not anchoring the oil guns in the proper position. Since the burners were not correctly positioned, oil atomization was not optimized, resulting in incomplete combustion. This problem was not recognized until the boiler was in the low steam generation mode. The oil burners were permanently repositioned on March 22, 2005. Another problem on March 16 was poor flue gas recirculation.

In light of the March 16-17 test results, Ecology requires that Fort James to limit the fuel types and steam loading as follows:

- Natural gas only; steam rate greater than 83,500 pounds per hour, on daily average.
- Natural gas as based fuel co-fired with No. 6 fuel oil; steam rate greater than 117,000 pounds per hour, on daily average.

The mill will track fuel types and steam generation. Report this information in monthly report.

I. No. 3 Power Boiler

Condition I

In 1991 the No. 1 and No. 2 power boilers were shut down. The No. 3 power boiler was converted from primarily oil to hog fuel firing. Natural gas is used to assist in hog fuel combustion. A new electrostatic precipitator was installed to control particulate matter. This shutdown and conversion were accomplished during the Camas Energy and Recovery Modernization Project. Reductions of particulate matter and sulfur dioxide (SO_2) emissions were realized with this project. For sources on which the permittee proposed making modifications, the permittee obtained a Prevention of Significant Deterioration permit and Notice of Construction approval. The Energy and Recovery Modernization project was approved by the Department and the EPA under orders PSD-88-3 and DE88-360. Modifications to the orders were made on October 18, 1991 and on September 1998 to clarify permit language, control operating parameter addition for the recovery furnaces, correction of erroneous permit conditions, and limit revisions.

Conditions I.1, I.2, and I.3 - Particulate and Opacity Limits

The major emission of concern from hog fuel boilers is particulate matter, although other pollutants, particularly carbon monoxide, may be emitted under poor operating conditions. Generation of particulate matter depends on a number of variables, such as furnace design, the composition of hog fuel burned, and combustion-air control. The hog fuel boilers that were decommissioned used cyclonic flow separators, cyclones, to remove particulate from the air discharge. This method provided relatively inefficient control of particulates. In the late 1980’s the No. 1 and No. 2 power boilers emitted a combined average of 538 tons of particulate per year.

EPA regulates hog fuel boiler emissions under 40 CFR 60 Part Db – Standards of Performance for Industrial-Commercial Steam Generating Units. Subpart Db limits particulate emissions to 0.10 lb/million Btu. This particulate concentration is equivalent to 0.05 gr/dscf corrected to 7% oxygen. Subpart Db also limits opacity to no greater than 20 percent on a six-minute average except for one six minute period per hour of not more than 27 percent.

The Department concluded that a three-field ESP attaining a PM_{10} emission level of 0.01 gr/dscf represents BACT for control of particulate emissions on the No. 3 power boiler. The annual PM_{10} emission limit was established by Ecology at 36 tons per year.

The mill uses a monthly source test to measure particulate emissions. If the measument is less than 75% of the limit for six consecutive months, the mill may reduced the source test frequency from every month to once every three month (quarterly). The less frequent source testing is allowed only as long as source tests continue to demonstrate emissions are less 75% of the limit.

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual particulate (PM_{10}) emissions from the No. 3 power boiler to 36 tons per year. To show compliance with this limit, the permittee, on a monthly* basis, will evaluate the particulate emissions for No. 3 power boiler using actual emissions from stack test results. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(\mathrm{N}\,\frac{days}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{C}\,\frac{ton\ PM}{year}$$

A = volumetric grain loading results from the monthly* EPA Method 5 or equivalent samplings, average of 3 one-hour runs.

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period

N = number of operating days per year

C = particulate emission rate in tons per year

This monthly* value will be summed to determine the annual tons per year of PM_{10} emissions.

Opacity limit compliance is monitored with a opacity meter. Visual test using reference method 9 can be used in place of the meter during the time when the meter is malfunctioned or not available..

Condition I.4 - Sulfur Dioxide Limits

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual sulfur dioxide (SO_2) emissions from the No. 3 power boiler to 99 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the SO_2 emissions for the No. 3 power boiler using an emission factor derived from stack tests. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{D}\,\frac{lb\ SO_2}{ton\ H.F.}\right)\left(\mathrm{E}\,\frac{ton\ H.F.}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{F}\,\frac{ton\ SO_2}{year}$$

D = emission factor derived from stack tests using EPA Method 6C in pounds per ton of hog fuel (H.F.)

E = hog fuel throughput at the No. 3 power boiler in tons per year

F = SO_2 emission rate in tons per year

Conditions I.5 - Nitrogen Oxides Limits

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual nitrogen oxide (NO_x) emissions from the No. 3 power boiler to 433 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the nitrogen oxide emissions for the No. 3 power boiler using CEM data. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{G}\,\frac{lb}{MMBtu}\right)\left(\mathrm{H}\,\frac{dry\,ton\,HF}{year}\right)\left(16.8\,\frac{MMBtu}{dry\,ton\,HF}\right)\left(\frac{1\,ton}{2000\,lbs}\right)=\mathrm{I}\,\frac{ton\,NO_X}{year}$$

G = average annual nitrogen oxide concentration measured by CEM using EPA Method 7E

H = total dry ton hog fuel burned per year

I = nitrogen oxide emission rate in tons per year

Conditions I.6 and I.7 - Carbon Monoxide and Volatile Organic Compounds Limits

The boiler design, monitoring and control, and operation and maintenance achieve annual emission limits of 1040 tons of CO per year and 121 tons of VOC per year. Ecology concluded that this achievement represents BACT for control of CO and LAER (Lowest Achievable Emissions Rate) for control of VOC. Compliance is determined by calculating CO and VOC emissions using actual stack test results.

Condition I.6 - Carbon Monoxide Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual carbon monoxide (CO) emissions from the No. 3 power boiler to 1040 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the carbon monoxide emissions for the No. 3 power boiler using an emission factor derived from stack test results. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{I}\,\frac{lb\ CO}{ton\ H.F.}\right)\left(\mathrm{E}\,\frac{tons\ H.F.}{year}\right)\left(\frac{1\ tons}{2{,}000\ lbs}\right)=\mathrm{J}\,\frac{ton\ CO}{year}$$

I = emission factor derived from stack tests using EPA Method 10 in pound per ton of hog fuel

E = hog fuel throughput at the No. 3 power boiler process in tons per year

J = carbon monoxide emission rate in tons per year

Condition I.7 - Volatile Organic Compounds Limit

Order DE-88-360 modification 2, PSD-88-3 modification 2, limit annual volatile organic compounds (VOC) emissions from the No. 3 power boiler to 121 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the volatile organic compound emissions for the boiler using an emission factor derived from stack test results. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{K}\,\frac{lb\ VOC}{ton\ H.F.}\right)\left(\mathrm{E}\,\frac{ton\ H.F.}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{L}\,\frac{ton\ VOC}{year}$$

K = emission factor derived from a previous stack tests using EPA Method 25A in pounds per ton of hog fuel

E = hog fuel throughput in tons per year at the No. 3 power boiler

L = volatile organic compound emission rate in tons per year

Condition I.8 - Electro-Static Precipitator inlet temperature

Metallic compounds released during combustion of wood condense out to the vapor phase as flue gas temperatures drop below about 500°F. In Order DE-88-360 and PSD-88-3, Ecology established as BACT for trace metals that Fort James would operate the No. 3 power boiler at a level below 500°F, in order to minimize condensation and collection of the trace metals.

The permittee will maintain records of the hourly average of this parameter. Whenever the hourly average ESP inlet temperature is greater than the specified operating limit, the mill shall take corrective action within 24 hours.

Condition I.9 - Operation Limits

Opacity is an indicator of the performance of the electrostatic precipitator, the particulate matter control device. The use of this monitor as a measure of control device performance is consistent both with U.S. EPA's Region X's interpretation of the applicability of periodic monitoring and with the intent of the Compliance Assurance Monitoring Rule (40 CFR Part 64), allowing a reasonable assurance of compliance can be demonstrated through a control device performance indicator. Whenever the parameter is greater than the specified operating range, the mill shall take corrective action within 24 hours.

Emission Estimates Using Emission Factors

Ecology provides the following factual basis to support using an emission factor from actual source tests to compute NO_x, CO, and VOC emissions. The emissions are a function of the type of fuel, combustion temperature, and the excess oxygen level in the particular combustion unit. For the No. 3 power boiler the fuels, combustion temperature, and excess oxygen levels are within a relatively narrow range.

Emissions type and quantity correlate to how well Fort James operates and maintains its process equipment and air pollutant control equipment. All of the regulated emission units have regular schedules for maintenance activities; i.e., on the fly, semiannual, and annual maintenance activities. Ecology requires the permittee to operate its equipment as efficiently as possible [WAC 173-405-040(10)]. Also, on the cost-savings perspective, all combustion units will be operated in the most efficient manner to save fuels, and hence minimize the emissions; i.e., fuel consumption inversely reflects efficiency, emissions and cost.

Furthermore, Ecology and EPA require that an initial performance test be conducted at a representative production rate, near the designed rate of the process. Additional source tests must be conducted at or above the average operating rate. If the operating rate exceeds the average production values and still meets the air emissions standards, the overall assessment is that the source test was representative and the system was in continuous compliance. In Ecology's experience, conducting the source test at high levels of production or throughput and using that data to calculate emissions overstates actual emissions. An example from the Fort James demonstrates this fact -- the time NO_x emissions were calculated for the No. 3 power boiler. Source tests from similar emission units were used to calculate potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. Actual emissions as measured by the NO_x CEM from 2001 to 2004 were 212, 76.5, 104, and 105 tons per year.

Annual emissions of SO_2, NO_x, CO, and VOC are tabulated below. Emissions for pollutants measured by source tests in 1998 demonstrated that emissions at representative operating conditions are well within the permit limits.

No. 3 Power Boiler Annual Emission Inventory

Pollutant	Permit LIMIT	2001 TPY	2002 TPY	2003 TPY	2004 TPY	Average
PM	36	7	7	5	2	5
SO_2	99	42	42	15.4	38.4	34.5
NO_x	433	212	76.5	104	105	124
VOC	121	0.4	0.3	0.7	0.5	0.5
CO	1040	42	11.4	17.6	16.7	21.9

In conclusion, using the professional judgment backup with actual source test results, Ecology determines that emission factors which are derived from representative operating conditions and proven long-term test results will accurately estimate the emissions of the boiler provided that routine maintenance activities play an important role in all operation.

J. No. 4 Power Boiler

Condition J

The No. 4 power boiler has not been modified since air pollution regulations were promulgated. The Department's general regulations apply to existing operation and the particulate limit is 0.1 gr/dscf. Three state-only regulations apply including the 20 percent opacity limit. The Department required that the permittee install and maintain a continuous opacity monitor. The permittee must report opacity excursions monthly in the Power Plant Air Monitoring Report. The opacity limit is a state-only requirement. Ecology approval of the conversion of the Magnefite Recovery Furnace under Regulatory Order DE-1147 limited fuel use in the No. 4 Power Boiler. These limits are covered by Condition J.4.

Condition J.1 – Particulate Limits

The No. 4 power boiler ensures compliance when firing natural gas and fuel oil based on the following calculations:

For particulate matter (PM) emissions from natural gas:

1. 5 lb PM/MMcf natural gas. Taken from Table 1.4-2 of AP-42, October 1996, for natural gas combustion.
2. F_d = 8,710 dscf/MMBtu for natural gas. "F" factor from 40 CFR, Part 60, App. A, Method 19.

3. Conversion factor of 1,035 MMBtu/MMcf natural gas.

$$\left(\frac{5\ lbs}{MMcf}\right)\left(\frac{1\ MMcf}{1{,}035\ MMBtu}\right)\left(\frac{1\ MMBtu}{8{,}710\ dscf}\right)\left(\frac{7{,}000\ gr}{1\ lb.}\right)\left(\frac{20.9 - 7.0}{20.9}\right) = 0.003\frac{gr}{dscf}$$

Therefore, the maximum actual particulate emissions of 0.003 gr/dscf corrected to 7% O_2 generated from natural gas combustion are less than the permit limit value of 0.1 gr/dscf. No ongoing compliance demonstration measures are required when firing natural gas.

For particulate matter (PM) emissions from fuel oil:

1. [9.19(S)+3.22] lb/1000 gallons fuel oil. Taken from Table 1.3-1 of AP-42, October 1996, for fuel oil combustion. For 2 percent sulfur content, fuel oil this equates to a particulate matter emission factor of 21.6 lb/1000 gallon.
2. F_d = 9,190 dscf/MMBtu for oil. “F” factor from 40 CFR, Part 60, App. A, Method 19.
3. Conversion factor of 141 MMBtu/1000 gallons fuel oil.

$$\left(\frac{21.6\ lbs}{1{,}000\ gal}\right)\left(\frac{1{,}000\ gal}{141\ MMBtu}\right)\left(\frac{1\ MMBtu}{9{,}190\ dscf}\right)\left(\frac{7{,}000\ gr}{lb}\right)\left(\frac{20.9 - 7.0}{20.9}\right) = 0.08\frac{gr}{dscf}$$

Therefore, the maximum actual particulate emissions of 0.08 gr/dscf, corrected to 7% oxygen, generated from fuel oil combustion are less than the allowed permit limit value of 0.1 gr/dscf.

Condition J.2 - Opacity Limits

The Department of Ecology General Regulation Chapter 173-400 WAC, limits opacity to 20 percent, except that opacity may exceed 20 percent for up to 15 consecutive minutes once in any eight hours. [WAC 173-400-040(1)(a).] The Department has required that the permittee install and maintain a continuous opacity monitor. The permittee must report opacity excursions monthly in the Power Plant Air Monitoring Report.

Fort James installed a continuous opacity monitor at the No. 4 power boiler in 1992. The monitor follows the procedures outlined in the Camas Mill’s power boiler Opacity Continuous Emission Monitors Quality Control/Quality Assurance Manual. All calibration data including frequency and quality objectives comply with 40 CFR Part 60 Appendix B, Performance Specification 1 and 40 CFR 60.13(d).

Condition J.3 – Sulfur Dioxide Limit

One of the other state-only requirements is the 1000 ppm, hourly average for sulfur dioxide. Fort James can burn natural gas in the boiler. This emission unit cannot exceed the limit when firing natural gas. Fort James can fire and currently uses fuel oil in the boiler. Fort James can meet 1000 ppm standard as long as the sulfur content of the fuel was below 2 percent by weight that the sulfur dioxide limit is attained. Thus, Ecology requires Fort James maintain fuel receipts to ensure that the fuel oil is less than or equal to 2 percent sulfur.

Condition J.4 – Fuel Input Limit

Order DE-1147-AQ04 limits annual fuel input to a total of 527,486 MMBtu and No. 6 fuel oil of 131,871 MMBtu. The permittee will track total fuel usage in million of British Thermal Units and report year-to-date usage in each monthly report.

Condition J.5 - Operation Limits (state-only)

The average opacity will be no greater than 20 percent for more than 6 consecutive minutes in any 60 minutes period. Whenever the parameter is greater than the specified operating range, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Corrective actions and opacity excursions will be reported in the monthly report.

K. K4/R8 and K5 Bleach Plants

Condition K

<u>Major Changes that Affected Emissions</u>

The mill operates two separate bleaching systems designated as K4/R8 and K5. The facility is subject to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for the Pulp and Paper Industry contained in 40 CFR 63, Subpart S. NESHAP, in 40 CFR, Section 63.445(c), requires certain bleaching vent streams to be collected and ducted to a control device used to reduced chlorinated HAP (measured as chlorine) emissions to:

1. Reduce the total chlorinated HAP mass in the vent stream entering the control device by 99% or more by weight.
2. Achieve a treatment outlet concentration of 10 parts per million (ppm) or less by volume of total chlorinated HAP. Or,
3. Achieve a treatment outlet mass emission rate of 0.001 kg of total chlorinated HAP mass per megagram (0.002 pounds per ton) of oven-dried pulp.

Emission controls at the K4/R8 bleach plant include a white liquor, scrubber for HAP control from the bleaching vents. Likewise, the K5 bleach plant's vent streams will be pulled through a separate white liquor scrubber.

Conditions K.1.a and K.1.b - Inspection of Enclosure Openings and Closed Vents

For compliance with the enclosure opening and closed vent requirements, Fort James will perform monthly inspection of each enclosure opening and closed vent system for capturing and transporting vent streams that contain HAP [40 CFR 63.453(k)]. The permit limit specifies the method in which any repair must be initiated according to 40 CFR 63.453(k)(6).

The permittee must record all periods during which bleach plant vent gases were not collected and treated each month pursuant to 40 CFR 63.453(b). Also, the permittee must report periods of such non-treatment monthly.

Conditions K.2.a, K.2.b, K.2.c, and K.2.d – Hazardous Air Pollutant Limits & Monitoring

Pursuant to 40 CFR 63.445(c), the permit limits the bleach plant's vent gases to 10 ppm or less chlorinated HAP at the K4/R8 scrubber outlet. The scrubber minimizes the HAP emissions to within the permit limit; thus, Ecology requires scrubber operational conditions in the permit to show that the pollution control device is operating. The permittee will continuously monitor scrubbing liquid flow rate, pressure drop range, scrubbing liquid pH, and fan amperage as compliance indicators. Amperage of the scrubber fan is used as an alternative monitoring parameter [40 CFR 63.453(m)] for the gas scrubber vent gas inlet flow rate specified in 40 CFR 63.453(c)(2).

On April 12, 2001 Fort James requested approval of an alternative monitoring parameter; the mill submitted further information on October 10, 2002 and October 10, 2003. EPA approved fan amperage as an alternative parameter on September 10, 2004. The hourly averages of the flow rate, pressure drop, and pH will be at least 150 gallons per minutes, $8<\Delta p<16$ inches of water, and pH>10, respectively. Condition K.2.b limits the scrubber fan amperage be greater than 14.5 on the hourly average.

Conditions K.3.a, K.3.b, K.3.c, K.3.d, and K.3.e - Hazardous Air Pollutants Limits and Monitoring

Pursuant to 40 CFR 63.445(c), the permit limits the bleach plant's vent gases to 0.002 pound per ton of oven-dried pulp or less at the K5 bleach plant. The scrubber minimizes the HAP emissions to within the permit limit; thus, Ecology requires scrubber operational conditions in the permit to show that the pollution control device is operating. The permittee will continuously monitor scrubbing liquid flow rate, pressure drop range, and scrubbing liquid pH as compliance indicators. Amperage of the scrubber fan is an alternative monitoring parameter [40 CFR 63.453(m)] for the gas scrubber vent gas inlet flow rate specified in 40 CFR 63.453(c)(2).

Fort James requested approval of an alternative monitoring parameter date on April 12, 2001 adding further information on October 10, 2002 and October 10, 2003. EPA approved fan amperage as an alternative parameter on September 10, 2004. The hourly averages of the flow rate, pressure drop, and pH will be at least 110 gallons per minutes, $6<\Delta p<16$ inches of water, and pH>10, respectively. Condition K.3.b limits the scrubber fan amperage in the range 8<AMP<18 on the hourly average. Since the K5 bleach plant is a displacement type process, fugitive emissions are emitted at the two displacement towers labeled multi-stage tower and D2 tower based on the data from the initial performance tests, Condition K.3.e limits hourly average chlorine dioxide addition rate to 28.4 pounds per UBODTP unbleached oven-dried ton of pulp.

Condition K.4 - Annual Leak Check

The permittee will demonstrate the integrity of each enclosure and closed-vent system for capturing and transporting vent streams that contain HAP. Condition K.4 requires the permittee to conduct an annual performance test on positive pressure closed-vent system using procedures specified in 40 CFR 63.457(d) and on negative pressure closed-vent system using procedures specified in 40 CFR 63.457(e). The permittee must report test results within 60 days of conducting test.

Condition K.5 – Reduce Chloroform Air Emissions

The permittee will comply with the provision 40 CFR 63.445(d)(2) by reducing chloroform air emissions to the atmosphere from its bleaching systems and bleaching pulp from kraft pulping processes that use any chlorinated compounds. Condition K.5 prohibits the use of hypochlorite or chlorine in the bleaching systems or line.

L. WILL II Sheeter

Condition L

Installation of the Will II Sheeter was completed in the summer of 1993, it started operation on June 21, 1993, and it reached full production on September 14, 1993. The Will II

Sheeter's particulate performance test was performed on December 2, 1993 and the results were submitted in April 1994. A Steelcraft Filtrex Model MP pulse jet baghouse controlled particulate emissions. The original filtration bags were Filtrex Model WI 16-oz woven polyester tube bags. The original equipment style bags were replaced in 1996 with polyester bags that contained a textured Teflon membrane liner for more effective particulate capture. The original mechanical vibrator was replaced with an acoustic cleaner on October 14, 2005.

<u>Particulate Emission Control</u>

Emission control at the Will II Sheeter is achieved using a fabric filter baghouse. Fabric filter baghouses are considered BACT for paper dust emissions. Source tests conducted after construction of the Sheeter (1993 and 1996) indicate that the unit emits less than 1 ton of particulate per year. These results were achieved when the baghouse pressure drop was within the manufactured specifications. To maintain these results, Ecology and Fort James have determined that the pressure drop will be monitored and corrective action taken when it is out of a range of 0.2-6.0 inches of water.

The design of fabric filtration control equipment, such as baghouses, depends upon a number of parameters. These parameters include the following: the design outlet particulate concentration, the choice of filter media, the gas to cloth ratio, the particulate being captured, the particulate penetration of the filter media, pressure drop, and volumetric flow rate.

Once the baghouse was constructed all of the parameters were approximately constant except for the pressure drop. For each filter media installation there is a normal range of pressure drops. When the pressure drop across the bags is small, it usually indicates a control equipment failure (broken bags, holes, or seal leakage). Excessive pressure drops denote an overloaded system, poor bag cleaning or pluggage. For the bags used at the mill, particulate collection efficiency is directly proportional to the pressure drop a minimum at 0.2 when the bag is clean and a maximum at 6.0 inches of water when the bag is fully loaded. Above 6.0 inches of water, particulate capture declines due to a reduction in the volumetric flow rate. As recorded through a maintenance program, pressure drop ranged from 0.6 inches of water with all new bags to a high of 4.2 inches of water. The pressure drops have not exceeded this value because the facility takes immediate corrective action. The first step is inspection, followed by maintenance.

The original filtration bags were Filtrex Model WI 16 oz. woven polyester tube bags. The mill used these bags until replacement bag availability problems forced the mill to consider other supplies. On September 1996, the original equipment style bags were replaced with alternative bags from Baghouse Accessories (BHA, Slater, Missouri). These 16 oz. woven polyester tube bags also contain a texture Teflon membrane liner for more effective particulate capture (refer to source test results in the table below). The baghouse collects paper dust from a paper cutting (converting) operation. The Sheeter is not a combustion unit; no HAPs are emitted from this source.

Ecology and EPA require new sources to conduct initial performance tests at representative production rates, near the design rate of the process. Additional source tests must be conducted at or above the average operating rate. If the operating rate exceeds the average production values and the measured emissions still meet the air emissions standards, the overall assessment is that the source test was representative and the system is in continuous compliance. In Ecology's experience, conducting the source test at high levels of production or throughput and using that data to calculate emissions overstates actual emissions. An example from Fort James demonstrates this fact: We reviewed the time NO_x

emissions were calculated for the No. 3 power boiler. Source tests from similar emission units calculated a potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. But actual emissions measured by the NO_x CEM from 2001 to 2004 were 212, 76.5, 104, and 105 tons per year.

The following particulate tests were conducted at the No. 2 Will Sheeter Baghouse.

Date Test Conducted	Particulate, gr/dscf
August 22, 2002	0.0008
July 18, 2003	0.0016
September 9, 2004	0.0008
July 13, 2005	0.0007
December 1, 2005	0.0006
Permit Limit	0.0080

Ecology is confident that the baghouse will provide adequate particulate control for this operation at all times provided that the monitored pressure drops are within the range of 0.2 to 6.0 inches of water during the operation. Therefore, continuous pressure drop monitoring, on-going maintenance program, and a particulate source test once per permit term is sufficient basis for compliance assurance.

Conditions L.1, L.2, and L.3 - Particulate and Opacity Limits

Order DE 93AQ-I140 required that the particulate emission concentration from the baghouse stack not to exceed 0.008 gr/dscf and that the opacity not to exceed 5%. A performance test demonstrated compliance with this limit. The amount of particulate emitted by the stack was minuscule. The average particulate concentration was 0.001 grain/dscf. This is well below the regulatory limit. The permittee will conduct a particulate test using EPA Method 5 once per permit term that consists of three one-hour tests using EPA Method 5 or a test method approved in writing by the Department. Using the performance test, an emission factor was developed that the permittee used to calculate the annual emission limit. We used the following algorithm to estimate the mass limit:

$$\left(\mathrm{A}\frac{gr}{dscf}\right)\left(\mathrm{B}\frac{dscf}{min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{1{,}440\ \ min}{day}\right)\left(\mathrm{N}\ \frac{days}{year}\right)\left(\frac{1\,ton}{2{,}000\ lbs}\right)=\mathrm{C}\ \frac{tons\ PM_{10}}{month}$$

A = volumetric grain loading results from the monthly* EPA Method 5 or equivalent samplings, average of 3 one-hour runs.

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period

N = number of operating days per year

C = particulate emission rate in tons per year

Condition L.4 - Operation Limits

Although there is only a small probability that the baghouse would be out of compliance, minimum operational conditions have been defined in the permit to show that the baghouse is operating. The baghouse pressure drop shall be monitored continuously. Weekly readings shall confirm that the pressure drop shall be maintained within a range of 0.2 to 6.0 inches of water.

The permitee will maintain a record of the pressure drop observations. Whenever the pressure drop is beyond the specified limits, the permittee will initiate corrective action within 24 hours[WAC 173-405-040(10)]. Failure to take corrective action within 24 hours would violate the rule. Excursions and corrective actions will be reported in the monthly report.

Wood Processing

Conditions M, N, O, and P

Improvements in the wood processing area were aimed at preventing or minimizing fugitive wood from impacting adjacent property. These emission units would have been categorized as insignificant emission units defined under WAC 173-401-530(4), but the units are operated under Regulatory Orders DE-87-309 and 95-AQI050. Therefore, these units are specifically regulated under the State Implementation Plan (SIP) according to WAC 173-401-530(2)(c).

Conditions M.1, M.2, & M.3 - Particulate and Opacity Limits – Screen Fines Truck Bin Cyclone

In Order DE-87-309 the Department determined that the Screen Fines Truck Bin Cyclone represented best available control technology. Particulate limits were established as 0.007 gr/dscf, with an annual limit of 2.6 tons per year. A performance test confirmed the mill's compliance with the 0.007 gr/dscf limit. Compliance with the annual limit is demonstrated by using actual emissions from previous stack test results.

Horizon Engineering L.L.C., an independent source test firm in Portland, Oregon, conducted a particulate emission test on the Screen Fines Cyclone. The following results were obtained:

Date Source Evaluation Conducted	Particulate, gr/dscf
July 25, 2001	0.00056
Permit Limit	0.00700

Ecology and EPA require that an initial performance test for a new source be conducted at a representative production rate, near the design rate of the process. Additional source tests are conducted at or above the average operating rate. If the operating rate exceeds the average production values and still meets the air emissions standards, the overall assessment concludes that the source test was representative and the system was in continuous compliance. [In Ecology's experience, conducting the source test at high levels of production or throughput and using that data to calculate emissions overstates actual emissions. An example from the Fort James mill showed this fact -- NO_x emissions were calculated for the No. 3 power boiler. Source tests from similar emission units were used to calculate potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. Actual emissions as monitored by the NO_x CEM from 1994 to 1998 have been 130, 104, 148, 128, and 140 tons per year.] These values are based on actual operating hours and throughput and are much less than using a value from a source test and a representative production rate to calculate emissions.

The estimated potential to emit for the screen fines truck bin cyclone was 2.6 tons per year. The initial performance test and the test conducted in 2001 reveal that emissions are significantly less than 1 ton per year. Considering the magnitude of the emissions and the performance of cyclones in controlling wood dust emissions, Ecology considers the permit, as written, fulfills the Title V requirement of “monitoring sufficient to demonstrate compliance”.

Condition M.4 - Operation Limits – Screen Fines Truck Bin Cyclone

In Order DE-87-309 the Department determined that a monthly inspection is required. The permittee will maintain an inspection log and make it available for review by Ecology. A monthly inspection of the cyclone is adequate. But whenever the cyclone malfunctions, when conditions may indicate holes in the cyclone, cyclone pluggage, or when mechanical defects cause wood dust to become airborne, the permittee will initiate corrective action within 24 hours [WAC 173-405-040(10)]. Failure to take corrective action within 24 hours would violate the rule. Excursions and corrective actions will be reported in the monthly report.

Conditions N.1, N.2, & N.3 - Particulate and Opacity Limits – Chip Packing Cyclone

Ecology determined in Order 87-309 that the Chip Packing Cyclone represented best available control technology. Particulate limits were established as 0.007 gr/dscf, with an annual limit of 1.4 tons per year. The mill will use actual emissions from previous stack test results to show compliance with the annual limit.

Ecology and EPA require that an initial performance test for a new source be conducted at a representative production rate, near the design rate of the process. Additional source tests are conducted at or above the average operating rate. If the operating rate exceeds the average production values and still meets the air emissions standards, the overall assessment is that the source test was representative and the system was in continuous compliance. [In Ecology’s experience, conducting the source test at high levels of production or throughput and using that data to calculate emissions overstates actual emissions. An example from the Fort James mill showed this fact -- NO_x emissions were calculated for the No. 3 power boiler. Source tests from similar emission units were used to calculate potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. Actual emissions as monitored by the NO_x CEM from 1994 to 1998 have been 130, 104, 148, 128, and 140 tons per year.] These values are based on actual operating hours and throughput and are much less than using a value from a source test and a representative production rate to calculate emissions.

The estimated potential to emit for the chip packing cyclone was 1.4 tons per year. The initial performance test reveals that emissions are significantly less than 1 ton per year. Considering the magnitude of the emissions and the performance of cyclones in controlling wood dust emissions, the Department considers the permit, as written, fulfills the Title V requirement of “monitoring sufficient to demonstrate compliance”.

Condition N.4 - Operation Limits – Chip Packing Cyclone

In Order DE-87-309 the Department determined that a monthly inspection is required. The permittee will maintain an inspection log and make it available for review by Ecology. A monthly inspection of the cyclone is adequate. Whenever the cyclone malfunctions, when conditions may indicate holes in the cyclone, during cyclone pluggage, or when mechanical defects cause wood dust to become airborne, the permittee will initiate corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Excursions and corrective actions will be reported in the monthly report.

Condition O.1 - Operation Limits – East Truck Unloader Conveyor

Wood chips and sawdust are source of particulate emissions. Thus, handling the materials by closed conveyors will help to minimize the particulate emissions. Refer to the following discussions for particulate emissions controls. Based on our engineering judgment, there will be no detectable sulfur dioxide emissions generated from the operation of the conveyors.

In Order DE-87-309 Ecology determined that a monthly inspection is required. Ecology required Fort James to install and operate water sprays, chutes, deflectors, or socks at conveyor discharge points. The permittee will maintain an inspection log and make it available for review by Ecology. A monthly inspection of the emission control equipment was determined to be adequate. Whenever the water sprays, chutes, and socks malfunction, the permittee will initiate corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Excursions and corrective actions will be reported in the monthly report.

Condition P.1 - Operation Limits – Fines Blow Line

Order 95-AQI050 requires Fort James to install and operate water sprays and deflectors that would be operated continuously during chip discharge at the K4 fines blow line. The permittee will maintain water pressure at a minimum of 30 psig. The inspection of the water sprays will be conducted on a daily basis and an inspection log will be maintained and made available for review by Ecology. Whenever the water sprays and deflectors malfunction, the permittee will initiate corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Excursions and corrective actions will be reported in the monthly report.

Q. Compliance Assurance Monitoring (CAM)

Condition Q

EPA promulaged compliance assurance monitoring (CAM) provisions with Section 504(b) of the 1990 Amendments to the Clean Air Act. The rule focuses on those pollutant-specific emissions units that rely on control devices to achieve compliance and for which Title V permits require periodic monitoring. Part 64 exempts certain units for which the underlying requirements already establish adequate monitoring for the emission limits being monitored. Sources subject to a federal NESHAP or NSPS standard (40 CFR 64.2(b)(1) are not required to complete CAM plans since they already satisfy the intent of Part 64 is to provide for adequate monitoring to assure compliance with the underlying permit limit or requirement. Particulate monitoring for the Kraft Combustions Sources including No.3 Kraft Recovery Furnace, No. 4 Kraft Recovery Furnace, No. 3 Smelt Dissolver, No. 4 Smelt Dissolver and No. 4 Lime Kiln are therefore exempt from the CAM rule. These emission units must conduct the monitoring as covered by 40 CFR 63 Subpart MM.

The No. 3 Power Boiler particulate monitoring and No. 5 Power Boiler particulate and NO_x monitoring are subject to the CAM requirements of 40 CFR 64. Particulate at No. 3 Power Boiler is monitored continuously using a continuous opacity monitor and particulate at No. 5 Power Boiler is monitored continuously using pressure drop and scrubber liquid flow through the venturi scrubber. Ecology has approved a monitoring approach, quality control/quality assurance (QA/QC), and indicator parameters for NO_x emissions at the No. 5 Power Boiler.

These parameters are part of the continuous monitoring system (CMS) for the No. 5 Power Boiler NOx compliance demonstration utilizing a Parametric Emission Modeling System (PEMS). The PEMS is presented in Section Q of the Air Operating Permit.

R. NESHAP SSM Plan, Recordkeeping, and Reporting

Condition R

The mill contains affected sources subject to the NESHAP (National Emissions Standards for Hazardous Air Pollutants) for the Pulp and Paper Industry (Subpart S) and the NESHAP for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semi-chemical Pulp Mills (Subpart MM). The startup, shutdown, and malfunction (SSM) plan, recordkeeping and reporting requirements from Conditions R.1 through R.10, apply to the affected sources listed in Sections A (No. 3 recovery furnace), Section B (No. 4 recovery furnace), Section D (No. 3 dissolver vent), Section E (No. 4 dissolver vent), Section G (No. lime kiln), Section K (Bleaching System), Section S (LVHC system), Section T (HVLC system), Section U (Pulping Process Condensates), and Section V (Steam Stripping System) of this permit. Condition R.11 applies to the affected sources listed in sections L, S, T, U, and V. Condition R.12 applies to the affected sources listed in sections A, B, D, E, and G.

S. Low Volume High Concentration (LVHC) System

Condition S

The pulping system at the mill is subject to the requirements specified under the federal NESHAP Subpart S. Fort James shall control the total HAP collected from the LVHC system [40 CFR 63.443]. Ecology requires the mill to capture and route gases from the following equipment in closed vent system to the No. 5 Power Boiler, the primary control device, or the No. 4 Lime Kiln:

- Kraft Batch Digesters
- Kraft Sawdust Digesters (Pandia)
- Kraft Kamyr continuous digester
- Multi- Effect Evaporator Systems,
- Blow Heat Evaporator System,
- Concentrator Systems,
- Foul condensate Steam Stripping System Collection Tank
- No. 3 Recovery Furnace Black Liquor Fuel Tank

Each enclosure and closed vent system shall be operated to meet:

- collection and treatment standards specified under 40 CFR 63.450;
- inspection and monitoring requirements under 40 CFR 63.453;
- recordkeeping requirements under 40 CFR 63.454; and
- test methods and procedures specified under 40 CFR 63.457.

T. High Volume Low Concentration (HVLC) System

Condition T

The pulping system at the mill is subject to the requirements specified under NESHAP Subpart S. Fort James shall control the total HAP collected from the HVLC system [40 CFR 63.443]. Ecology requires the mill to capture and route gases from the following equipment in closed vent system to the No. 3 Recovery Furnace, and/ or the No. 4 Recovery Furnace:

Brown stock washers

Primary knotters

Screening system

(The methanol emissions from both screen system vents at the Camas Mill were less than 0.2 pounds of methanol per oven-dried ton of pulp and were not collected, except for one vent which caused a nuisance situation inside the pulp mill building. All the other screen room chests vent to inside the pulp mill building.)

Decker

Oxygen delignification system

Each enclosure and closed vent system shall be operated to meet:

Collection and treatment standards specified under 40 CFR 63.450;
Inspection and monitoring requirements under 40 CFR 63.453;
Recordkeeping requirements under 40 CFR 63.454;
Test methods and procedures specified under 40 CFR 63.457.

Based on a study of the above pulping sources and other miscellaneous pulping sources, the mill collects other vents (state only sources) including the following:

Black Liquor Fuel Tanks

Weak Black Liquor tanks

Salt Cake Mix Tank

U. Pulping Process Condensates and Foul Condensate Steam Stripping System (NESHAP Subpart S)

Condition U

The pulping system at the mill is subject to the requirements specified under NESHAP Subpart S. Fort James will collect and treat pulping condensate [40 CFR 63.446]. Pulping process condensates from the following equipment will be conveyed in a closed collection system [40 CFR 63.446(d)(1) and (2)] and treated by the steam stripper system according to provision [40 CFR 63.446(c)(3)]:

No. 2 Evaporator,

No. 3 Evaporator,

No. 4 Evaporator,

Blow heat Evaporator,

Blow Heat Accumulator,

K5 Digester, and

HVLC system.

Fort James will control stripper-off gases from the treatment above. The gases will be routed in a closed-pipe system to either or both the No. 5 Power Boiler and the No. 4 Lime Kiln.

Each closed collection system is designed and operated to meet:

Drain system requirements under 40 CFR 63.960, 63.961, and 63.962;

Inspection and monitoring requirements under 40 CFR 63.453, 63.964;
Recordkeeping requirements under 40 CFR 63.454; and 63.965; and
Test methods and procedures specified under 40 CFR 63.457.

The pulping system at the mill is subject to the requirements specified under NESHAP Subpart S. Fort James will collect and treat pulping condensate [40 CFR 63.446]. Pulping process condensates specified above will be treated by the steam stripper system according to provision [40 CFR 63.446(c)(3)].

Fort James will control stripper-off gases, and monitor methanol removal efficiency over 30-day running averages. The stripper off-gases (SOGs) will be routed in a closed-pipe system to the No. 5 Power Boiler or the No. 4 Lime Kiln.

The steam stripper is designed and operated to meet:

- At least 11.1 lb methanol/oven dried ton collected and at least 10.2 lb/ton removal or treatment efficiency specified under 40 CFR 63.446(c)(3) and 40 CFR 63.446(e)(5); and
- Recordkeeping requirements under 40 CFR 63.454; and 63.

V. Core Manufacturing Process

Condition V

The Permittee will limit the amount of HAP emissions in the core manufacturing operation. The mill will comply with the provision 40 CFR 63.3370, Subpart JJJJ by the using coating materials containing no more than 4% HAP mass of the total mass of coating materials applied each month, or by using coating solids containing no more than 20% HAP mass of the total mass of coating solids applied each month.

Permittee will maintain Material Safety Data Sheets and/or other information describes coating formulations and organic HAP content, along with a monthly log of adhesive quantities used to manufacture cores. The mill will make this monthly log available to Ecology beginning December 5, 2005. [40 CFR 63.3370, Subpart JJJJ]

Attachment A
Particulate Bubble Limit in accordance with 40 CFR 63 Subpart MM

(Excerpt from Fort James Camas L.L.C. report dated October 2004 entitled "Chemical Recovery Combustion Source Hazardous Air Pollutant Particulate Test Results and the Technical Basis for Continuous Compliance".)

5.7 PARTICULATE BUBBLE LIMIT

In 40 CFR 63, Subpart MM, the U. S. Environmental Protection Agency provides two alternatives for hazardous air pollutant compliance. A facility can either use particulate limit of a specific process unit, or meet a limit that bubbles the particulate emissions from the entire chemical recovery system. The Camas Mill has selected the latter option for compliance. The data for the bubble calculations are presented in Tables 2 and 9. The calculations are contained in Table 10. The results are summarized as follows:

	Particulate, lbs/ton BLS
Overall PM Emission Limit	1.2898
Emission Rate:	
Lime Kiln	0.2191
No. 3 Recovery Furnace	0.6830
No. 4 Recovery Furnace	0.7967
Nos. 3&4 Recovery Combined	0.7469
No. 3 Smelt Dissolver Tank	0.0970
No. 4 Smelt Dissolver Tank	0.1200
Nos. 3&4 Smelt Dissolvers Combined	0.1088
Overall PM Emission Rate	1.0748

The overall particulate emission rate (combined emissions from the lime kiln, the No. 3 Recovery Furnace, the No. 3 Smelt Dissolver, the No. 4 Recovery Furnace, and the No. 4 Smelt Dissolver) measured during the performance tests was less than the overall particulate emission limit indicating compliance.

TABLE 2: LIME KILN AND SMELT DISSOLVER PARTICULATE MEASUREMENTS, OPACITY OBSERVATIONS, AND OPERATING PARAMETERS

Source	Test Date 2004	Particulate Matter, gr/dscf	Average % Opacity	Scrubber		Fuel	Mud Flow tons/day
				Pressure Drop inches	Flow gpm		
Lime Kiln	2/21	0.039	--	25.0	533	Oil	614
	5/20	0.036	6.0	24.9	450	Oil	580
	9/01	0.022	--	25.0	450	Oil	453
	Permit Limit	0.067	35.0	24.0	380	Gas	--
	Permit Limit	0.130	35.0	24.0	380	Oil	--
	MACT II	0.064	--	--	--	--	--

Source	Test Date 2004	Particulate Matter		Average % Opacity	Scrubber		
		gr/dscf	lbs/ton BLS		Pressure Drop inches	Flow gpm	pH
No. 3 Smelt Dissolver	1/08	0.047	0.059	--	8.2	2179	11.3
	4/16	0.051	0.065	--	6.9	2163	11.3
	6/21	0.061	0.084	3.8	7.4	2182	11.3
	7/31	0.046	0.052	--	7.6	2150	11.1
	10/20	0.060	0.069	--	10.4	2167	11.1
	Permit Limit	--	0.120	20.0	3.0	2000	9.0
	MACT II	--	0.260	--	--	--	--
No. 4 Smelt Dissolver	1/29	0.035	0.065	--	10.3	2552	11.2
	2/04	0.041	0.063	--	10.2	2534	11.2
	3/26	0.049	0.075	--	10.3	2558	11.2
	4/14	0.036	0.055	--	10.1	2543	11.2
	5/06	0.038	0.082	3.3	10.4	2457	11.2
	8/31	0.037	0.064	--	10.5	2585	11.2
	Permit Limit	--	0.120	20.0	7.5	2000	9.0
	MACT II	--	0.200	--	--	--	--

TABLE 9. PERFORMANCE TEST INPUTS FOR THE PARTICULATE BUBBLE CALCULATIONS

Source	Test Date 2004	Particulate Matter, gr/dscf	Stack Flow, dscf/minute	Black Liquor Solids, tons day
Lime Kiln[a]	2/21	0.039	14,239	1832
	5/20	0.036	10,520	1850
	9/01	0.022	16,543	1366
	Mean	**0.032**	**13,767**	**1683**
No. 3 Recovery Furnace[b]	4/29	0.0038	99,601	949.6
	4/29	0.0039	87,518	957.6
	6/17	0.0022	95,242	955.3
	6/17	0.0025	90,077	905.9
	6/29	0.0018	89,988	970.3
	8/04	0.0014	83,953	840.2
	8/10	0.0014	94,972	932.9
	8/11	0.0014	61,121	630.3
	8/11	0.0010	70,212	718.6
	8/12	0.0012	73,869	747.2
	8/12	0.0008	74,983	746.4
	8/13	0.0011	73,623	759.2
	8/13	0.0011	84,264	812.7
	8/17	0.0010	89,257	839.4
	8/18	0.0019	87,938	839.1
	8/20	0.0036	90,959	860.1
	8/20	0.0019	89,371	865.3
	9/10	0.0052	92,321	874.0
	10/13	0.0052	85,740	874.0
	Mean	**0.0022**	**85,000**	**846.0**
No. 3 Smelt Dissolver[b]	1/08	0.047	5,374	1208
	4/16	0.051	4,814	1076
	6/21	0.061	5,802	867
	7/31	0.046	4,632	1171
	10/20	0.060	5,030	906
	Mean	**0.053**[c]	**5,130**	**1046**

TABLE 9. PERFORMANCE TEST INPUTS FOR THE PARTICULATE BUBBLE CALCULATIONS (Continued)

Source	Test Date 2004	Particulate Matter, gr/dscf	Stack Flow, dscf/minute	Black Liquor Solids, tons day
No. 4 Recovery Furnace[b]	5/03	0.020	152,729	1182.1
	5/03	0.021	152,501	1224.2
	5/06	0.017	133,997	1132.6
	5/13	0.014	128,204	1011.4
	5/13	0.013	126,997	1030.2
	5/17	0.022	132,327	1026.7
	5/25	0.014	114,948	1045.4
	6/03	0.021	135,865	1187.5
	6/04	0.022	131,334	1183.0
	6/04	0.022	147,639	1187.7
	6/14	0.012	101,090	856.4
	6/15	0.012	115,074	993.3
	6/15	0.014	116,548	1066.1
	6/16	0.018	109,651	1017.7
	6/16	0.015	119,841	1021.7
	6/18	0.017	114,850	1055.1
	6/18	0.017	124,432	1101.5
	6/21	0.024	135,397	1246.0
	Mean	**0.018**	**127,413**	**1087.2**
No. 4 Smelt Dissolver[b]	1/29	0.035	9,310	1043
	2/04	0.041	8,641	1155
	3/26	0.049	8,831	1174
	4/14	0.036	8,187	1105
	5/06	0.038	11,457	1091
	8/31	0.037	9,072	1105
	Mean	**0.039**[d]	**9,250**	**1112**

[a] Particulate matter and stack flow corrected to 10% oxygen.

[b] Particulate matter and stack flow corrected to 8% oxygen.

[c] Equal to 0.066 lbs/ton BLS fired.

[d] Equal to 0.067 lbs/ton BLS fired.

TABLE 10. PARTICULATE BUBBLE LIMIT CALCULATIONS

Assumptions:
1. Data from Tables 2 and 9.
2. Proposed emission limits from the current air operating permit.
3. Calculation equations from 40 CFR 63.865 (January 12, 2001 or most recent version).

Overall PM Emission Limit

$$EL_{PM} = \frac{[(C_{ref,\,RF})(Q_{RF\,tot}) + (C_{ref,\,LK})(Q_{LK\,tot})]\ F1}{BLS_{tot}} + ER1_{ref,\,SDT}$$

$$\frac{[(0.044\text{ gr/dscf})(212{,}413\text{ dscf/min}) + (0.064\text{ gr/dscf})(13{,}767\text{ dscf/min }(0.206)}{1933.2\text{ ton/day}}$$

$$+\ 0.2\text{ lb/ton} = \frac{(9346.2 + 881)(0.206)}{1933.2} + 0.2\text{ lb/ton} \quad = 1.2898\text{ lbs/ton BLS}$$

Where:

EL_{PM} = Overall PM emission limit for all existing process units in the chemical recovery system at the kraft or soda pulp mill, kg/MG (lb/ton) of black liquor solids fired;

$C_{ref,\,RF}$ = Reference concentration of 0.10 g/dscm (0.044 gr/dscf) corrected to 8 percent oxygen for existing kraft or soda recovery furnaces;

$Q_{RF\,tot}$ = Sum of the average volumetric gas flow rates measured during the performance test and corrected to 8 percent oxygen for all existing recovery furnaces in the chemical recovery system at the kraft or soda pulp mill, dry standard cubic meters per minute (dscm/min)(dry standard cubic feet per minute [dscf/min]);

$C_{ref,\,LK}$ = Reference concentration of 0.15 g/dscm (0.064 gr/dscf) corrected to 10 percent oxygen for existing kraft or soda lime kilns;

$Q_{LK\,tot}$= Sum of the average volumetric gas flow rates measured during the performance test and corrected to 10 percent oxygen for all existing lime kilns in the chemical recovery system at the kraft or soda pulp mill, dscm/min (dscf/min);

F1 = Conversion factor, 1.44 minutes·kilogram/day·gram (min·kg/d·g) (0.206 minutes·pound/day·grain [min·lb/d·gr]);

BLS_{tot} = Sum of the average black liquor solids firing rates of all existing recovery furnaces in the chemical recovery system at the kraft or soda pulp mill measured during the performance test, megagrams per day (Mg/d) (tons per day [ton/d]) of black liquor solids fired; and

$ER1_{ref,\,SDT}$ = Reference emission rate of 0.10 kg/Mg (0.20 lb/ton) of black liquor solids fired for existing kraft or soda smelt dissolving tanks.

TABLE 10. PARTICULATE BUBBLE LIMIT CALCULATIONS
(Continued)

Emission Rate – Recovery Furnaces

$$ER_{RF} = (F1)(C_{EL,\,RF})(Q_{RF})/(BLS)$$

$$EL_{RF3} = \frac{(0.206)(0.033\ \text{gr/dscf})(85{,}000\ \text{dscf/min})}{846\ \text{ton BLS/day}} = 0.6830\ \text{lbs/ton BLS}$$

$$EL_{RF4} = \frac{(0.206)(0.033\ \text{gr/dscf})(127{,}413\ \text{dscf/min})}{1087.2\ \text{ton BLS/day}} = 0.7967\ \text{lbs/ton BLS}$$

$$EL_{RF\ 3/4} = (0.6830\ \text{lbs/ton})\frac{(846\ \text{tons/day})}{(1933\ \text{tons/day})} + (0.7967\ \text{lbs/ton})\frac{(1087\ \text{tons/day})}{(1933\ \text{tons/day})}$$

$$0.2989 + 0.4480 = 0.7469\ \text{lbs/ton BLS}$$

Where:

ER_{RF} = Emission rate from each recovery furnace, kg/Mg (lb/ton) of black liquor solids.

F1 = Conversion factor, 1.44 min·kg/d·g (0.206 min·lb/d·gr).

$C_{EL,\,RF}$ = PM emission limit proposed by owner or operator for the recovery furnace, g/dscm (gr/dscf) corrected to 8 percent oxygen.

Q_{RF} = Average volumetric gas flow rate from the recovery furnace measured during the performance test and corrected to 8 percent oxygen, dscm/min (dscf/min).

BLS = Average black liquor solids firing rate of the recovery furnace measured during the performance test, Mg/d (ton/d) of black liquor solids.

TABLE 10. PARTICULATE BUBBLE LIMIT CALCULATIONS
(Continued)

Emission Rate – Smelt Dissolver Tanks

$$ER_{SDT} = (F1)(C_{EL,\,SDT})(Q_{SDT})/(BLS)$$

$$EL_{SDT3} = \frac{(0.206)(0.096\ \text{gr/dscf})(5130\ \text{dscf/min})}{1046\ \text{ton BLS/day}} = 0.0970\ \text{lbs/ton BLS}$$

$$EL_{SDT4} = \frac{(0.206)(0.070\ \text{gr/dscf})(9250\ \text{dscf/min})}{1112\ \text{ton BLS/day}} = 0.1200\ \text{lbs/ton BLS}$$

$$EL_{SDT\ 3/4} = (0.0970\ \text{lbs/ton})\ \frac{(1046\ \text{tons/day})}{(2158\ \text{tons/day})} + (0.1200\ \text{lbs/ton})\ \frac{(1112\ \text{tons/day})}{(2158\ \text{tons/day})}$$

$$0.0470 + 0.0618 = 0.1088\ \text{lbs/ton BLS}$$

Where:

ER_{SDT} = Emission rate from each SDT, kg/MG (lb/ton) of black liquor solids fired.

F1 = Conversion factor, 1.44 min·kg/d·g (0.206 min·lb/d·gr).

$C_{EL,\,SDT}$ = PM emission limit proposed by owner or operator for the smelt dissolver tank, g/dscm (gr/dscf).

Q_{SDT} = Average volumetric gas flow rate from the smelt dissolving tank measured during the performance test, dscm/min (dscf/min).

BLS = Average black liquor solids firing rate of the associated recovery furnace measured during the performance test, Mg/d (ton/d) of black liquor solids fired. If more than one SDT is used to dissolve the smelt from a given recovery furnace, then the black liquor solids firing rate of the furnace must be proportioned according to the size of the SDT.

TABLE 10. <u>PARTICULATE BUBBLE LIMIT CALCULATIONS</u>
(Continued)

<u>Emission Rate – Lime Kiln</u>

<u>The following calculations will illustrate the oil fire at the lime kiln. It is possible for this source to burn natural gas, then the calculations will be adjusted accordingly.</u>

$ER_{LK} = (F1)(C_{EL,\ LK})(Q_{LK})/(\ BLS_{tot})$

$$EL_{LK} = \frac{(0.206)(0.130\ \text{gr/dscf})(13{,}767\ \text{dscf/min})}{1683\ \text{ton BLS/day}} = 0.2191\ \text{lbs/ton BLS}$$

Where:

ER_{LK} = Emission rate from each lime kiln, kg/Mg (lb/ton) of black liquor solids.

F1 = Conversion factor, 1.44 min·kg/d·g (0.206 min·lb/d·gr).

$C_{EL,\ LK}$ = PM emission limit proposed by owner or operator for the lime kiln, g/dscm (gr/dscf) corrected to 10 percent oxygen.

Q_{LK} = Average volumetric gas flow rate from the lime kiln measured during the performance test and corrected to 10 percent oxygen, dscm/min (dscf/min).

BLS_{tot} = Sum of the average black liquor solids firing rates of all recovery furnaces in the chemical recovery system at the mill measured during the performance test, Mg/d (ton/d) of black liquor solids.

<u>Overall Emission Rates</u>

$ER_{tot} = ER_{RF\ 3/4} + ER_{SDT\ 3/4} + ER_{LK}$

$ER_{tot} = (0.7469) + (0.1088) + (0.2191) = 1.0748$ lbs/ton BLS

Response to Comments

<u>Title V Air Operting Permits</u>

Any major sources of air pollution are required to obtain an Air Operating Permit (AOP). “Major source” means an operation could produce at least 100 tons/year of a criteria air pollutant, 10 tons/year of a hazardous air pollutant, and/or 25 tons/year of a combination of hazardous air pollutants. Ecology issues these permits, which allows the source to operate – under certain condition -- for five (5) years.

Ecology uses the AOP Program as an administrative tool for implementing regulatory requirements that apply to these major sources. The AOP compiles all applicable regulatory requirements into a single document to facilitate identification of permit conditions and rules. The AOP includes emission limitations, work practice standards, and monitoring, reporting, and recordkeeping conditions. The AOP Program is designed to enhance accountability and compliance by requiring sources to submit periodic reports certifying compliance with permit terms and conditions.

Proposed Permit Renewal

Federal and state laws require any pulp and paper mill located in this state to obtain an Air Operating Permit from the Department of Ecology. The permit allows the mill to operate so long as it complies with permit conditions that limit the kinds, concentrations, and masses of pollutants the facility releases to the atmosphere. This proposed permit renews Fort James’s existing permission to operate, with some changed Conditions that account for changes at the mill.

Facility and Process Changes

The mill uses the kraft process to convert wood chips and sawdust into pulp. Fort James bleaches brown pulp and blends it with purchased pulp or waste paper to produce tissue, toweling, and communication paper.

Major additions to the proposed Air Operating Permit include:

- MACT I requirements to control hazardous air pollutant emissions from the pulp and paper production areas,
- Order DE-1147 about monitoring requirements that apply to No. 5 Power Boiler (converted from the Magnefite Recovery Furnace),
- Compliance Assurance Monitoring requirements, and
- MACT II requirements to control hazardous air pollutant emissions from the pulping chemical recovery combustion areas of the mill.

The most significant change in the mill during this permit period was the 2001 shutdown of the sulfite pulping operation and the 2004 conversion of its Magnefite recovery furnace into the Mill’s No. 5 Power Boiler.

<u>Process used to consult with the public</u>

Ecology drafted an AOP for the Fort James Camas L.L.C. Ecology made it available for public review in Camas (at the mill) and in Vancouver (at the Fort Vancouver Main Public Library). Ecology invited public comments on the draft, through a public notice printed in the Camas and Vancouver Newspapers, and set a period from November 23, 2006 through December 29, 2006 -- to obtain public comment on the draft.

Ecology received 20 comments from citizen, Officials of City of Camas to the Office of the State of Representative. All comments urged Ecology to renew the permit.

Ecology received one comment form the Camas mill. In this letter Fort James asked us to correct typographical errors found during the Public Comment Period. In addition, Fort James also identified the parts of the draft permit and the Support Document that need clarifications. Ecology made those changes to the AOP and the Support Document.

The Environmental Protection Agency (EPA) Region X reviewed the draft permit according to Section 505(b)(1) of the Clean Air Act. On December 21, 2005, EPA notified Ecology that they will not object to Ecology's issuance of the permit.